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TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

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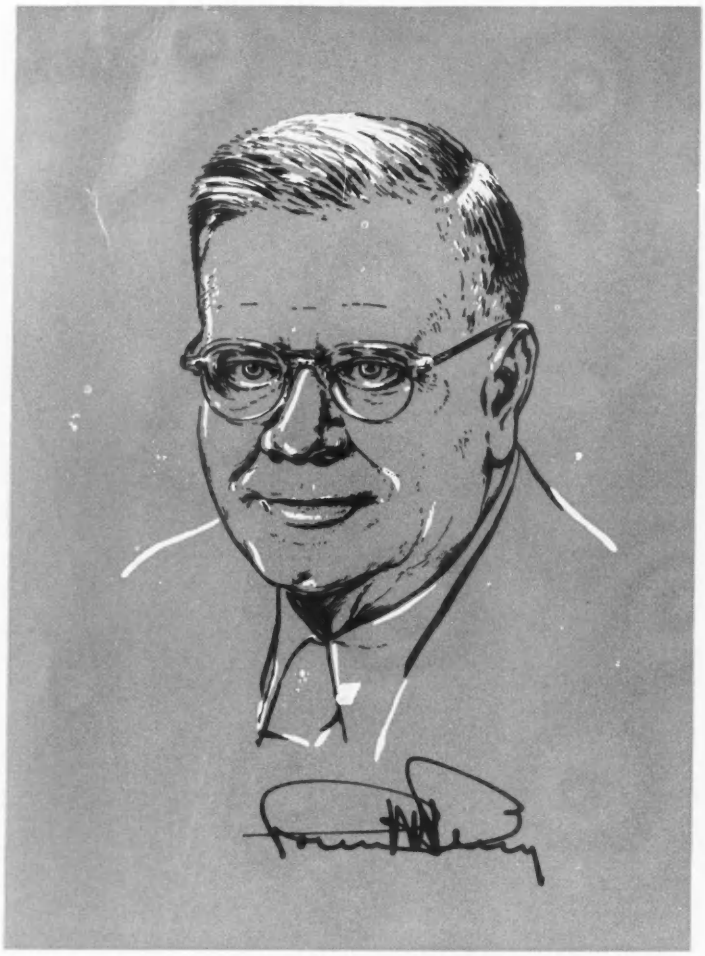
NEW LABOR SAVING EQUIPMENT, by John S. Reed

Essentials Of A Good Service Index, by D. A. Perigo

SERVING THE YELLOW PAGES FIFTY YEARS



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Since 1910

SHERRON STEEL BOOTHS CHOSEN FOR NEW FABULOUS IDLEWILD AIRPORT

You might suppose that the Sherron steel multiple booths in this photograph were made to order. You'd suppose wrong. These are standard Sherron phone booth multiples. You'll see variations of this grouping throughout Eastern Airline's new terminal at Idlewild Airport. Multiples of threes and fours . . . all strategically situated so the hurrying air traveler won't have to look far to find a phone booth to make an urgent call.

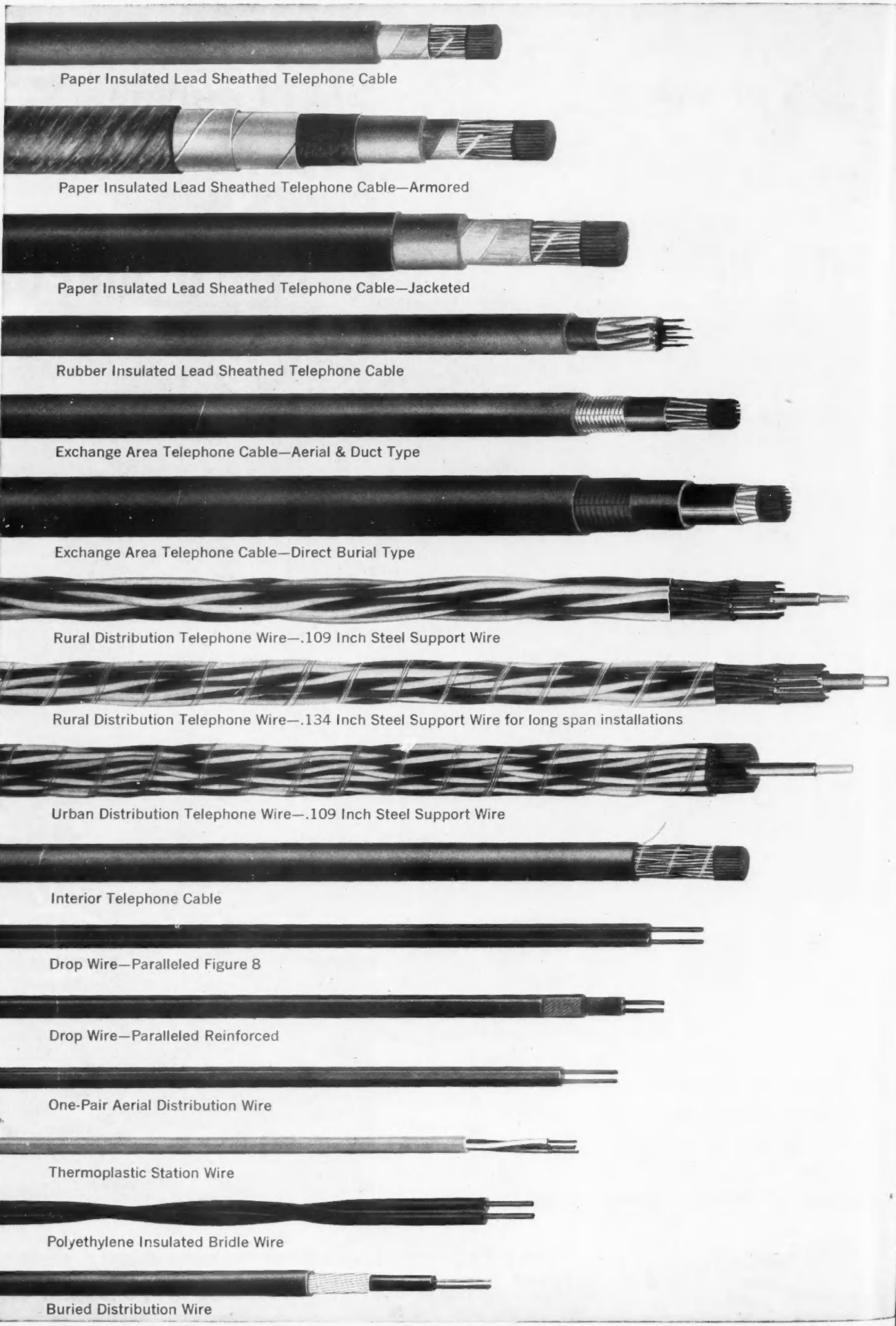
SEE OUR CATALOG IN SWEET'S

INDEPENDENT

Sherron ACOUSTIC SEE-THRU STEEL-STAINLESS STEEL OUTDOOR AND INDOOR TELEPHONE BOOTHS

There's a Sherron booth for every location and budget in either zinc coated or stainless steel

SHERRON METALLIC CORP., 1201 FLUSHING AVE., BROOKLYN 37, N.Y.



Paper Insulated Lead Sheathed Telephone Cable

Paper Insulated Lead Sheathed Telephone Cable—Armored

Paper Insulated Lead Sheathed Telephone Cable—Jacketed

Rubber Insulated Lead Sheathed Telephone Cable

Exchange Area Telephone Cable—Aerial & Duct Type

Exchange Area Telephone Cable—Direct Burial Type

Rural Distribution Telephone Wire—.109 Inch Steel Support Wire

Rural Distribution Telephone Wire—.134 Inch Steel Support Wire for long span installations

Urban Distribution Telephone Wire—.109 Inch Steel Support Wire

Interior Telephone Cable

Drop Wire—Paralleled Figure 8

Drop Wire—Paralleled Reinforced

One-Pair Aerial Distribution Wire

Thermoplastic Station Wire

Polyethylene Insulated Bridle Wire

Buried Distribution Wire

FOR PRODUCT DEPENDABILITY... SPECIFY

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TELEPHONE WIRE & CABLE

... the "mine-to-market" quality line!

Behind the rugged dependability and high quality of Phelps Dodge telephone wire and cable are years of experience and research in the design and manufacture of communication cables.

Phelps Dodge pioneered the use of lead, paper, rubber and thermoplastics as applied to wire and cable. This valuable background of knowledge is combined by Phelps Dodge with highest grade materials and controlled craftsmanship in fabrication. The result is a complete line of reliable telephone wire and cable that helps reduce maintenance costs and provide longer in-life service.

Phelps Dodge will be glad to help you fill your wire and cable requirements. Get in touch with your nearest Phelps Dodge sales office.

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PD

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How many of these

DIALAPHONE*P

TO BE SOLD

REAL ESTATE AGENT

TO BE SOLD

AUTOMOBILE DEALER

TO BE SOLD

CLASSIFIED ADVERTISING DEPARTMENT OF NEWSPAPER

TO BE SOLD

INSURANCE COMPANY

TO BE SOLD

BANK CREDIT MANAGER

TO BE SOLD

TO BE SOLD

PURCHASING AGENT

PROSPECTS *have you sold?*

Shown here are six businesses in your community that *need* Dialaphone! Have you installed Dialaphone in each of these offices? If not, give some demonstrations today!

These are only a few of the many Dialaphone prospects in your community. You'll think of many more. Dialaphone is a big boon to business subscribers who make a lot of calls. It's especially helpful for repetitive calling. And, don't forget, Dialaphone is available in any of our 10 telephone colors.

To order, call your A.E. representative today! Address: *Automatic Electric Sales Corporation, Northlake, Illinois. Or call Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada) Limited, 185 Bartley Drive, Toronto 16, Ontario.*

Dialaphone gives your subscriber Push-Button Dialing!

With Dialaphone, your subscriber makes calls faster, easier and more accurately. An indexed Directory Tape provides space for 850 separate listings. The subscriber simply turns a crank that spins the tape—when the name of the desired party appears in the View Frame, he presses the Starter Key and the call is completed *automatically.*

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Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

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TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

VOL. 64 NO. 10 MAY 15, 1960

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The TE&M Front Cover

On April 18 Judge TYRE W. BURTON (right), chairman of the Missouri Public Service Commission, made the first official call over Missouri's first automatic mobile radiotelephone system while C. W. CHASTAIN, gen. mgr., Grand River Mutual Tel. Corp., Princeton, Mo., did a bit of eavesdropping. Talking through a recently developed push-button radiotelephone system installed by the Grand River Mutual Tel. Corp., Judge Burton placed a call directly to Governor James T. Blair at Jefferson City.

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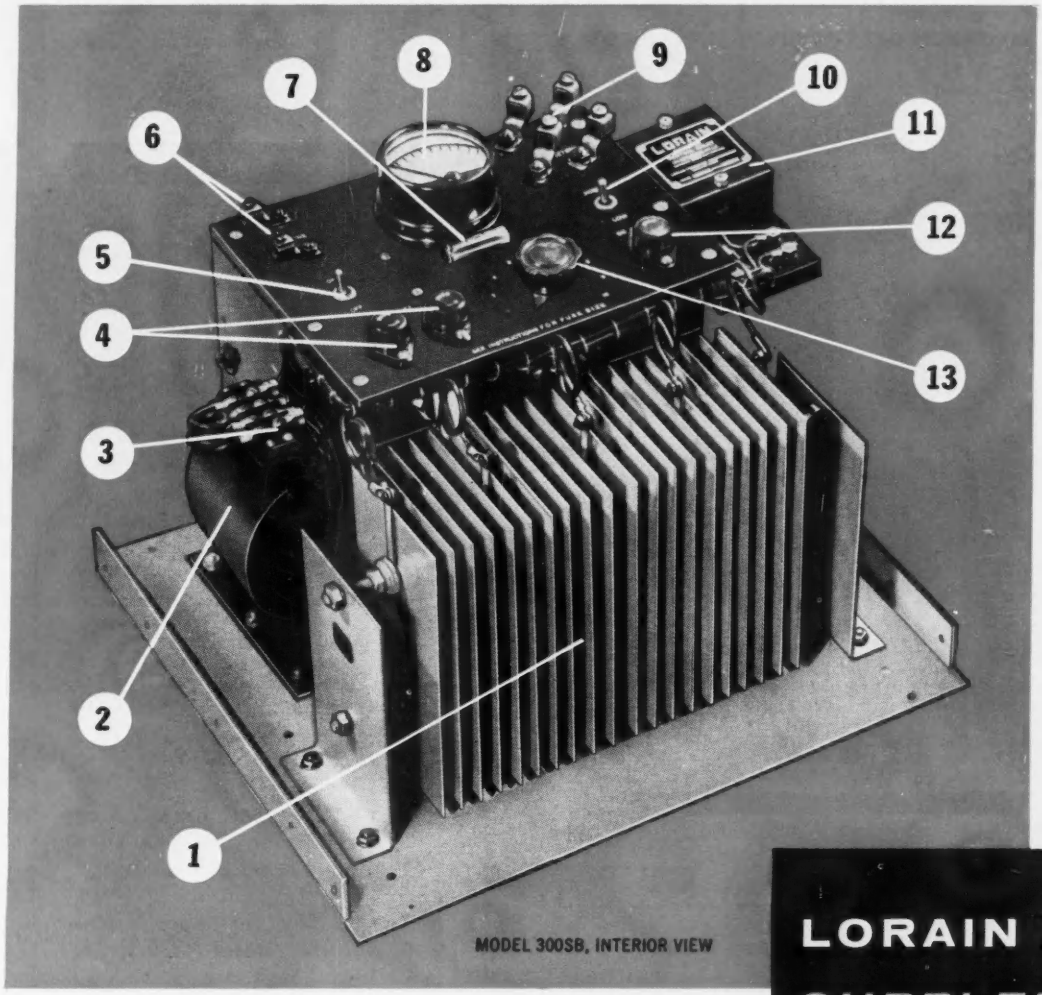


MODEL 300SB, INTERIOR VIEW

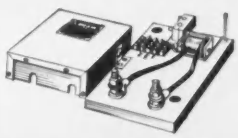
1. Selenium rectifier
2. Isolating transformer
3. Taps to adjust for A-C line voltage
4. A-C line fuses
5. On-off switch
6. A-C input terminals
7. Neon lamp to indicate tripping of overload relay
8. Output ammeter
9. D-C connections
10. Output range selector switch
11. Control relay, type FS1R
12. D-C load fuse
13. Tap switch

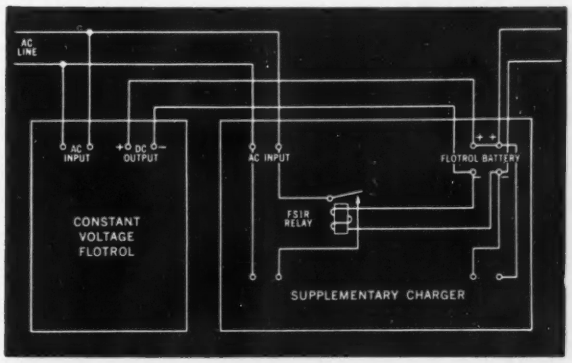
LORAIN FLOTROL SUPPLEMENTARY CHARGERS

For peak loads and growing plants . . . save money with "a Flotrol and a half"

Here is the low-cost answer to expanding loads that are taxing the capacity of your charger. A Lorain Supplementary Charger matched to your Flotrol as much as doubles its capacity at a fraction of the cost of a larger Flotrol. It is also used in new installations to get an "in-between-size" Flotrol and avoid paying for un-needed capacity. The Supplementary Unit delivers a constant current which is adjustable by a tap switch. Controlled by the master Flotrol, it provides a closely regulated output voltage. A control relay shuts the unit off when it is not needed. Proved in service since 1950. Thousands in use. Seven models, with output from 3 to 24 amps., 45-56 and 25 volts. Rack or wall mount. Write for Bulletin 171A.

FS1R Control Relay is mounted inside the unit and is wired as below. Externally mounted control relays (see right) are offered to simplify heavy wiring for the larger Flotrols.





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our equipment is sold through leading telephone distributors

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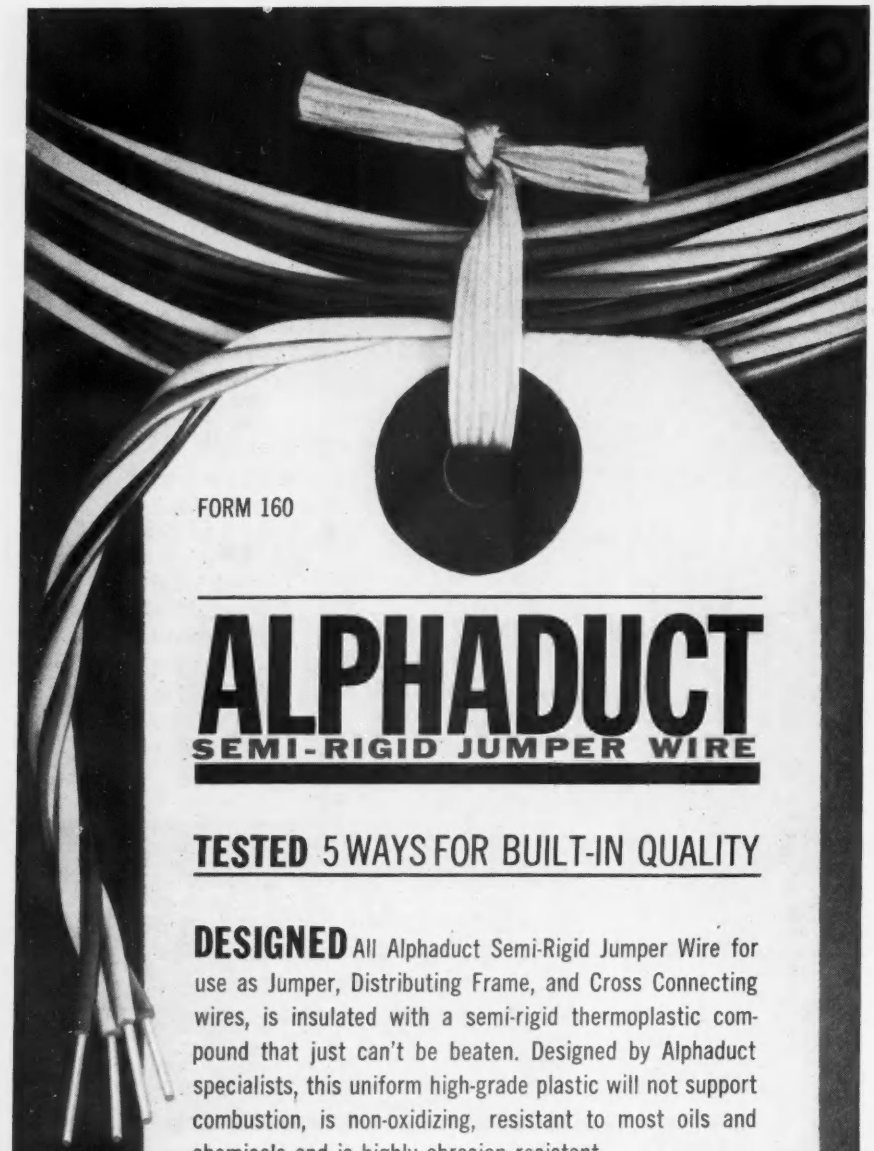
1122 F Street Lorain, Ohio Phone: ATlantic 8-9191



FORM 160

ALPHADUCT
SEMI-RIGID JUMPER WIRE

TESTED 5 WAYS FOR BUILT-IN QUALITY

DESIGNED All Alphaduct Semi-Rigid Jumper Wire for use as Jumper, Distributing Frame, and Cross Connecting wires, is insulated with a semi-rigid thermoplastic compound that just can't be beaten. Designed by Alphaduct specialists, this uniform high-grade plastic will not support combustion, is non-oxidizing, resistant to most oils and chemicals and is highly abrasion resistant.

GUARANTEED We guarantee it because Alphaduct rigorously tests these wires 5 ways for: compression • shrink back • heat shock • cold bend • flame resistance... to insure you products with that Alphaduct built-in quality.

SPECIFY When you specify Alphaduct Semi-Rigid Jumper Wire, or any one of Alphaduct's different types of telephone wire—you buy the know-how of the recognized leader in the manufacture of insulated wires for the Independent Telephone Industry.

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WIRE AND CABLE CO.
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CHerry 9-8090

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coming

CONVENTIONS

ILLINOIS Tel. Assoc., Abraham Lincoln Hotel, Springfield, Ill., May 19-20.

KANSAS-MISSOURI, Tel. Associations, Town House, Kansas City, Kans., May 23-24.

PENNSYLVANIA Tel. Assoc. Bedford Springs Hotel, Bedford Springs, Pa., June 6-8.

CALIFORNIA Tel. Assoc., Fairmont Hotel, San Francisco, Calif., June 8-10.

WASHINGTON-OREGON Tel. Associations, Sheraton Portland Hotel, Portland, Ore., June 16-17.

NEW YORK Tel. Assoc., Scaroon Manor, Schroon Lake, N. Y., June 20-22.

TENNESSEE Tel. Assoc., Hermitage Hotel, Nashville, Tenn., Sept. 7-8.

ARKANSAS Tel. Assoc., Hermitage Hotel, Hot Springs, Ark., Sept. 12-13.

MICHIGAN Tel. Assoc., Grand Hotel, Mackinac Island, Mich., Sept. 12-13.

ROCKY MT. Tel. Assoc., Hilton Hotel, Denver, Colo., Sept. 14-16.

NEVADA Tel. Assoc., Hotel Nevada, Ely, Nevada, Sept. 21, 22, 23.

NEW ENGLAND Tel. Assoc., Mt. Washington Hotel, Bretton Woods, N. H., Sept. 25-28.

NATIONAL CONVENTION, Conrad Hilton Hotel, Chicago, Ill., Oct. 9-12.

SOUTH CAROLINA Tel. Association, Clemson House, Clemson, S. C., Oct. 24-25.

VIRGINIA Tel. Association, Roanoke Hotel, Roanoke, Va., Oct. 27-28.

when this happens...

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photo by Don Poli

Complete line of station and high voltage protectors

Reliable

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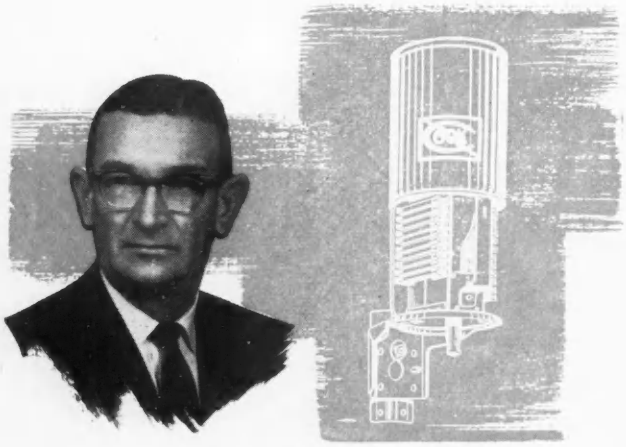
Meet the men who serve the Independent Telephone Industry throughout the nation with equipment and services that keep pace with the expanding economy and technical advances in modern telephony. They provide fast, efficient, courteous services that have been a tradition in Cook Electric Company for over half a century, and they promote the use of the highest quality protection and distribution equipment used by the industry today.



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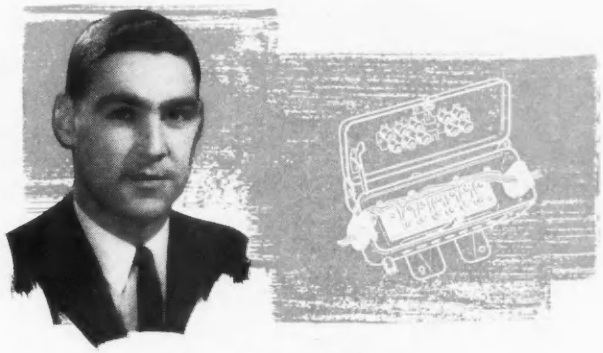
Kingfisher, Oklahoma
Kingfisher 789



R. B. McMAHON

4 years outside plant engineer with a southern New England telephone company.

Servicing Indiana, Michigan, Ohio

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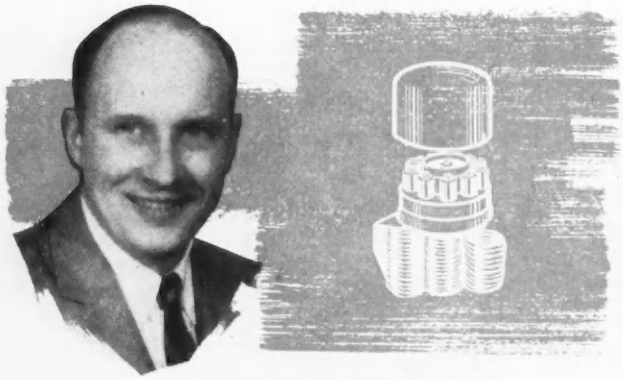
Toledo 14, Ohio
Evergreen 5-3751

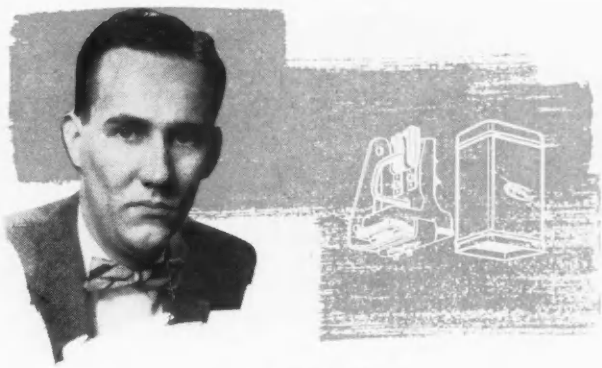


W. T. COMERFORD

12 years operating experience with a southeastern telephone company.

Servicing Delaware, Maryland, West Virginia, Kentucky, Virginia, Tennessee, North Carolina

332 Cedar Valley Road
Bristol, Tennessee
South 4-1933
South 4-3214



D. J. TURNER

5 years background of manufacturing Cook telephone equipment.

Servicing Idaho, Oregon, Wyoming, Washington, Montana

1403 Olympic
Edmonds, Washington
Prospect 6-4566

COOK ELECTRIC COMPANY

These men carry out the Company's policy by providing the industry with new ideas, new products and new services that are of the utmost importance to vigorous growth, greatest economy and modern development of the Independent Telephone Industry.

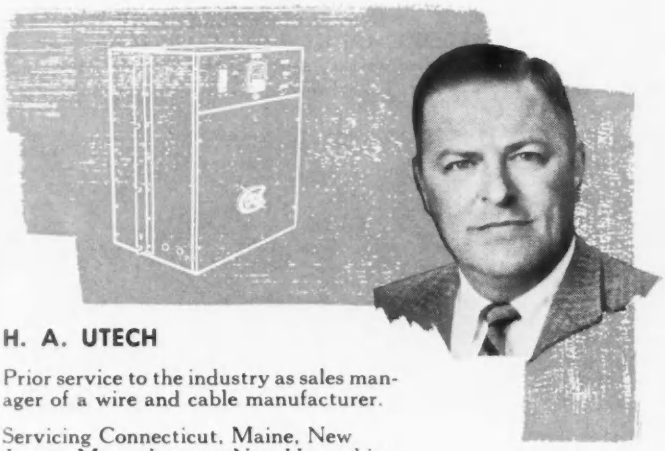
The Cook Electric Company Team working with the Company's Distributors are your most dependable source of assistance, and they are ready to help you in every possible way.

M. E. VAIL

A former manager-owner of his own telephone company.

Servicing Illinois, Kansas, Missouri, Nebraska

Route 11, Box 1710
Springfield, Missouri
University 6-6990



H. A. UTECH

Prior service to the industry as sales manager of a wire and cable manufacturer.

Servicing Connecticut, Maine, New Jersey, Massachusetts, New Hampshire, New York, Pennsylvania, Vermont, Rhode Island

18 Pinecrest
Warwick, New York
Yukon 6-4778
Yukon 6-3424

E. J. PERKINS

15 years serving the independent telephone companies in the West.

Servicing Arizona, Utah, California, Colorado, Nevada

10805 Seven Hills Drive
Tujunga, California
Florida 3-1979

T. J. GENTILE

6 years serving the telephone and electrical industry in North Central States.

Servicing North Dakota, South Dakota, Minnesota, Wisconsin, Iowa

8833 Poplar Bridge Road
Minneapolis 20, Minnesota
Tuxedo 8-5909

W. RICHARDSON

A Dean of the telephone industry in the Southeast.

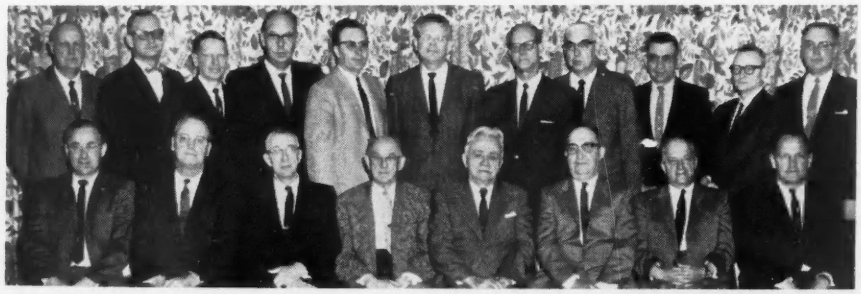
Servicing Mississippi, Alabama, Georgia, South Carolina, Florida

1806 Atapha Nene
Tallahassee, Florida
Tallahassee 3-1273

INDUSTRY VIEWS

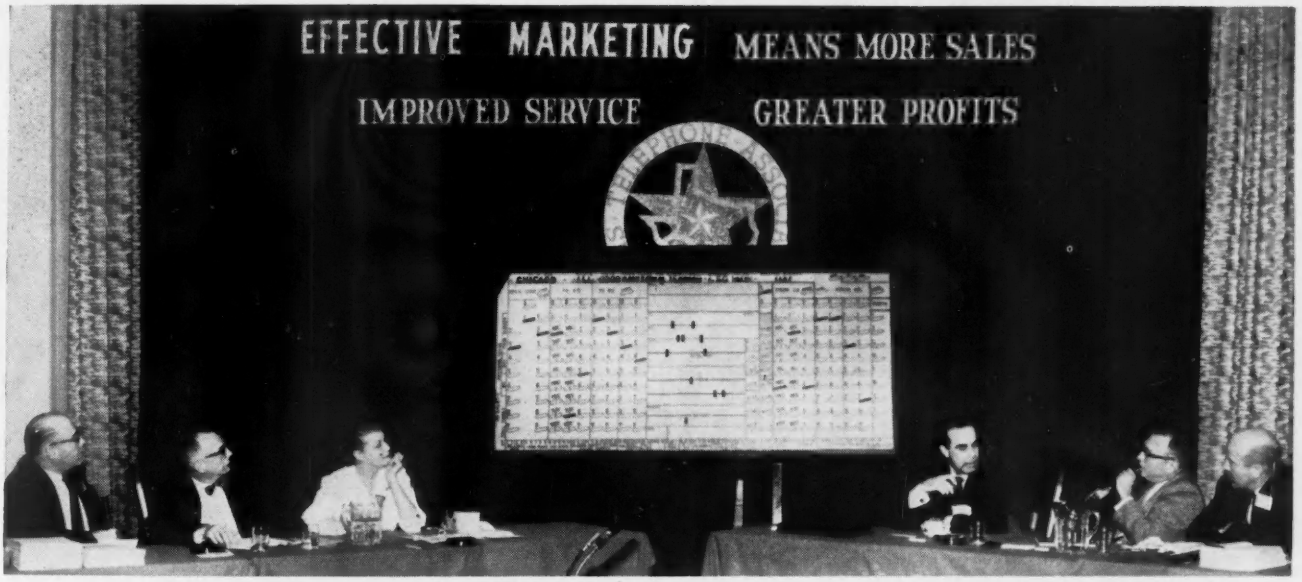
JOHN D. COOPER has been appointed equipment engineer for the Rochester (N. Y.) Telephone Corporation. Cooper joined the company in 1947 as an assistant engineer after serving three years with the Stromberg-Carlson Co. He is a graduate of the Brooklyn (N. Y.) Technical High School, and received a bachelor's degree in Electrical Engineering from Rensselaer Polytechnic Institute. He is an associate member of the American Institute of Electrical Engineers.

Special feature of the Ohio convention was the introduction of four Trading Posts of Ideas consisting of panel discussions followed by question and answer periods. Covering the fields of accounting, commercial-public relations, plant-equipment and traffic, each group had its own resource personnel and moderator. Shown above are the experts from the Traffic Trading Post of Ideas (l. to r.): FRANK W. DONAHUE, traffic engineer-planning, Ohio Bell Telephone Co., Cleveland; MRS. EMMA LOU GEUS, personnel manager, Midland Mutual Life Insurance Co., Columbus; MRS. FLORENCE GASKALLA, chief operator, Elyria Telephone Co., moderator of the discussion; and CHARLES MURRAY, traffic manager, Lorain Telephone Co.



Directors of the Iowa Independent Tel. Assoc. Back Row (l to r): C. C. PEARCE, Riceville; GENE DAUBENDIEK, Jefferson; K. A. YOUNG, Ft. Dodge; A. W. SANDERS, New London; ROSS VERNON, Sioux Center; EDWARD G. CARLSON, Creston; JOSEPH L. VAN HORN, Grinnell; HAROLD THOMPSON, Clear Lake; E. B. ZERWAS, Manning; L. E. TRAVIS, Newton; W. MILLER, Des Moines. Front Row (l to r): H. F. MELICK, West Liberty; HOWARD AMICK, Des Moines; V. D. PECK, Primghar; H. B. MELICK, West Liberty; W. H. FOWLER, Pella; H. MILLER, Great Bend, Kans.; CLYDE McFARLIN, Montezuma; J. J. McINTOSH, Cedar Rapids.

Officers and directors of the Texas Telephone Association (seated, l to r): W. G. WINTERS, Houston; A. L. ROBB, Electra; PAM D. GRINSTEAD, treas., Kerrville; H. Y. PRICE, JR., 2nd vice pres., San Marcos; MARION A. CLAY, pres., Lufkin; J. B. HALEY, exec. sec., Austin; D. G. GARDNER, JR., Nocona. Standing (l to r): D. T. STRICKLAND, Brownwood; R. D. GOODSON, Dallas; CHARLES HENDRIX, Brazoria; DEE COLE, Greenville; GUY SMELSER, Bogata; C. R. DOWD, Hawkins; J. T. CHAMBERS, Tenaha; J. B. McDUFF, Crockett; FABIAN BEARDEN, Baird; C. H. GILMER, Rocksprings; C. G. MENDENHALL, Anahuac; E. H. DANNER, San Angelo. Not shown are: W. S. Bain, 1st vice pres., San Antonio; Morris S. Burton, Tyler; J. T. Ricketts, Vega; and Oscar Burton, director ex officio, Tyler.

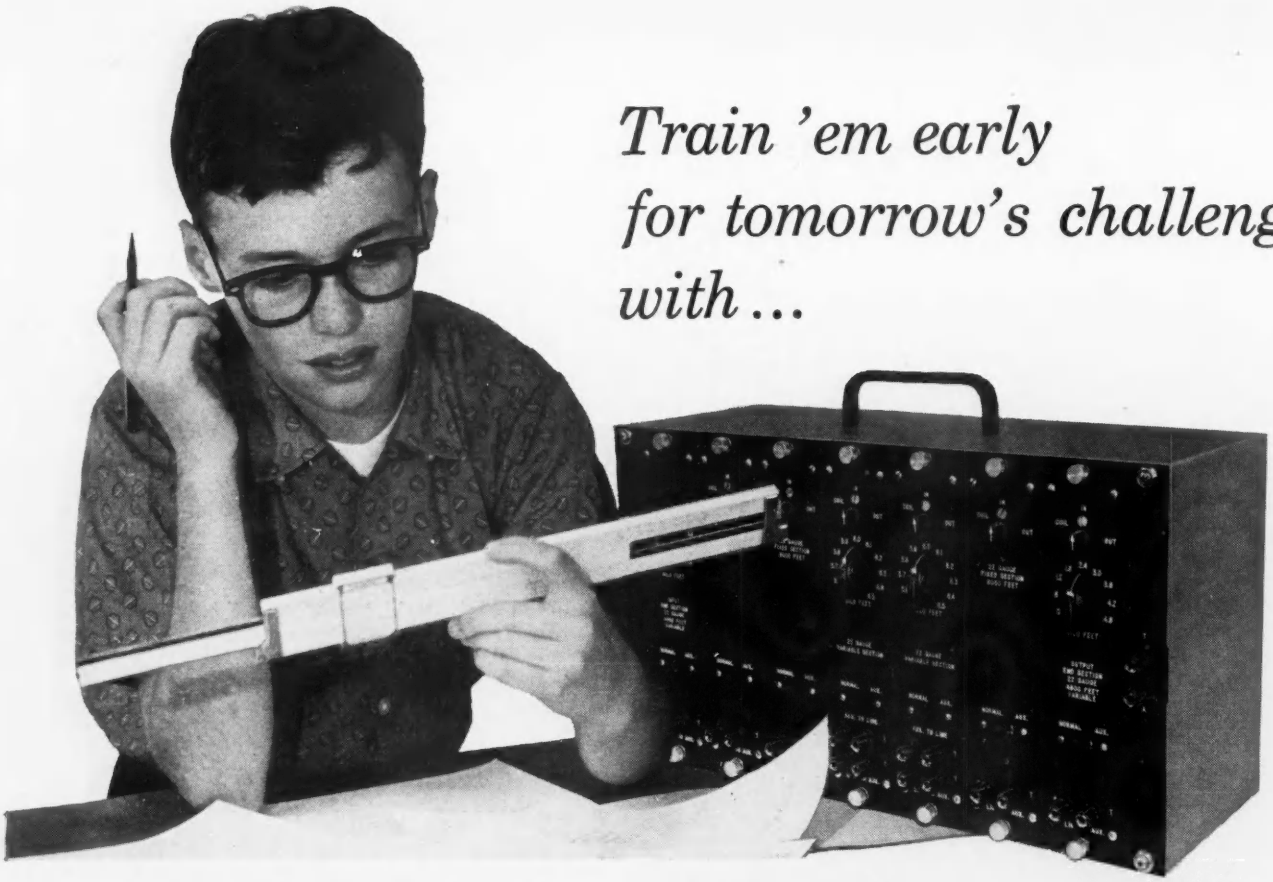


Participants in Texas convention discussion of Mark Sensing are (l to r): N. T. DUNLAP and MERT STEINER of Southwestern Bell Tel. Co., Dallas; MRS. WINNIE BURNETT and JACK RUTLAND of Southwestern States Tel. Co., Brownwood; GERALD BETTES and OSCAR WEISZ of the General Tel. Co. of the Southwest, San Angelo.

Among the 30 Safety Awards presented by the Industrial Commission of Ohio, Columbus, at the Ohio convention, seven went to Independent telephone organizations having the best safety records based on the number of man hours of labor exposed to accidents and 23 to companies having no accidents whatsoever during 1959. Pictured above are representatives who accepted the Safety Awards on behalf of their companies.

B. M. FREE, United Tel. Co. of Pennsylvania, observes with satisfaction as Shippensburg State College senior, JANE SHELLENBERGER, completes inaugural Direct Distance Dialing from Shippensburg, Pa. (United Utilities System). Miss Shellenberger dialed her home telephone and spoke with her mother in New Wales, Pa.

Officers of the Kentucky Telephone Association (l to r): Vice Pres. GORDON SAUNDERS, Lexington; Pres. D. B. CORMAN, Glasgow; Vice Pres. A. L. DAUGHTERS, Covington; and Sec-Treas. RALPH F. KESSINGER, Lexington.



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Look for much that's new and exciting to happen in the communications systems field in the next five years . . . DDD for most of U.S. and Canada . . . CAMA for more and more large toll usage areas . . . line concentration . . . electronic switching . . . a rapidly expanding demand for private line services . . . and a great deal more advances requiring special design.

Despite satellites, the workhorse of systems communications will still be the same old cable pairs. But with alternate routing and VNL you'll regard them in a new light; and you'll take a more searching look at load coil spacings, net loss and return loss, while bias and sigma (old words with new meanings) will force you to correct trunks that don't meet minimum standards.

You can best meet this challenge by launching a comprehensive training program to begin now!

AIRTRONICS Artificial Lines can be a vital tool in your technical training program for plant and engineering people. In them are combined all the essential elements for use in demonstration lectures, in laboratory classes — or both.

GENERAL SPECIFICATIONS

AIRTRONICS standard Artificial Lines accurately simulate a loaded or non-loaded cable pair of any desired length — from 600 to 39,600 feet.* Multi-position switches afford instant control over total length or load section lengths, so that coil spacings may be set to better than 1%, or as much as 10%. Common irregularities such as bridged taps, mixed loading or coils omitted can be introduced in a moment.

**Available with plug-in units for either #22 or #24 gauge cable, or mixed 22 and 24 gauge. Other commonly used gauges available on special order.*

For more detailed technical specifications, just ask us to rush you AIRTRONICS Artificial Line Brochure #1.021A. It will include equipment arrangements for a number of demonstration set-ups clearly showing the effect of equalizers, loading systems, reflections, singing points, and other characteristics.

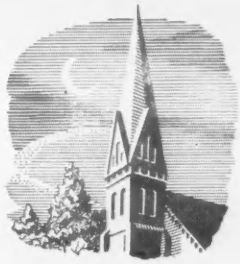
other product FIRSTS from Airtronics:

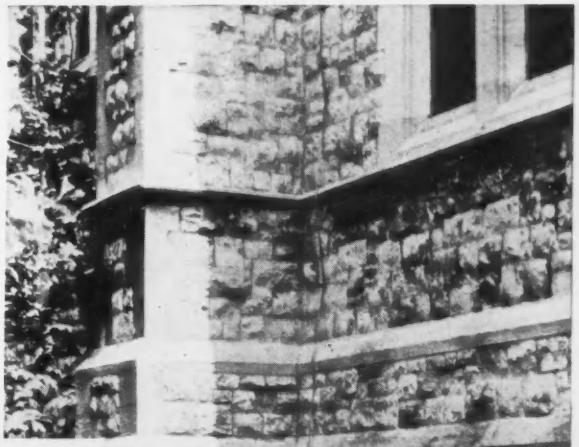
- Program Equalizers
- Portable Test Hybrid Sets
- Artificial Transmission Lines
- Line Matching and Terminating Sets
- Switch Gain Amplifiers
- Pulse Meters
- Transmission Measuring Sets

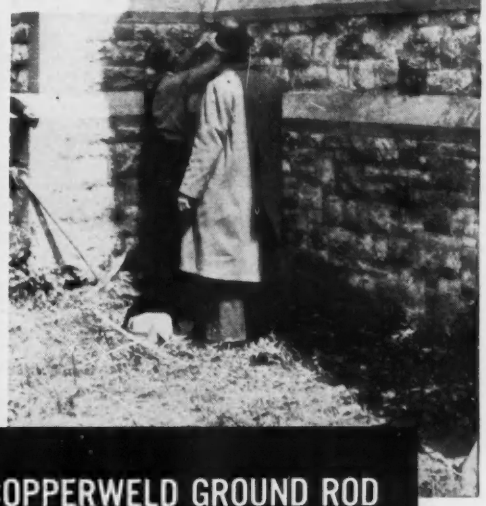
AIRTRONICS INTERNATIONAL CORPORATION

P. O. Box 8576, Fort Lauderdale, Florida (6900 West Road 84)

Dug up in an old English churchyard after 25 years' service







—COPPERWELD GROUND ROD
still good for many
more years of use

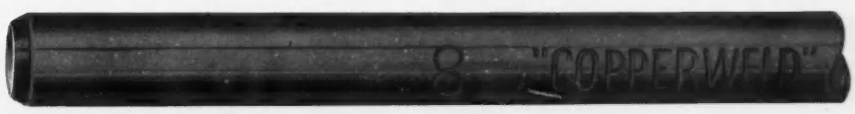
Copperweld Ground Rods never die—they don't even fade away. They go right on protecting your overhead lines and equipment, year after year, after year.

A company in England, specializing in lightning protection, recently exhumed a Copperweld Ground Rod put into service in 1935 to protect St. Matthews Church near London. When originally installed, this 5/8" x 8-foot rod had a resistance reading of 10 ohms—and when dug up and examined, the rod was in perfect physical condition—ready for many more years of use.

For dependable, long-lasting grounds use Copperweld—the only ground rods with a thick copper covering inseparably molten-welded to a strong steel core. They provide stiffness for easy driving and rust resistance for long life. Copper-to-copper contacts throughout assure low resistance. For your protection, each rod is stamped "Copperweld."

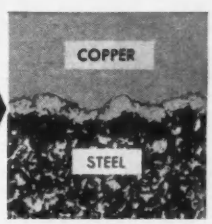
COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION *Glassport, Pa.*
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, N.Y.

Copperweld®



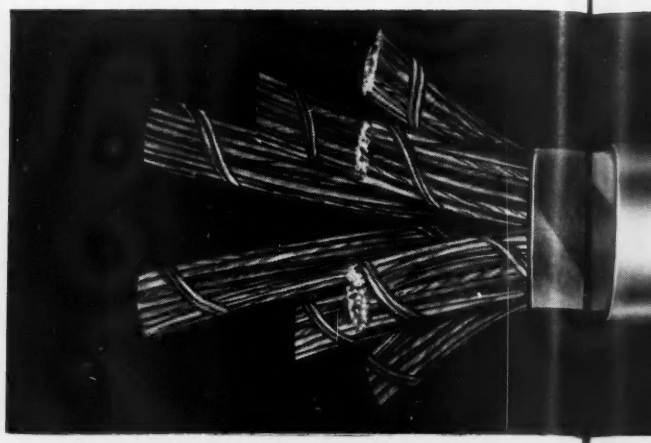
ground rods

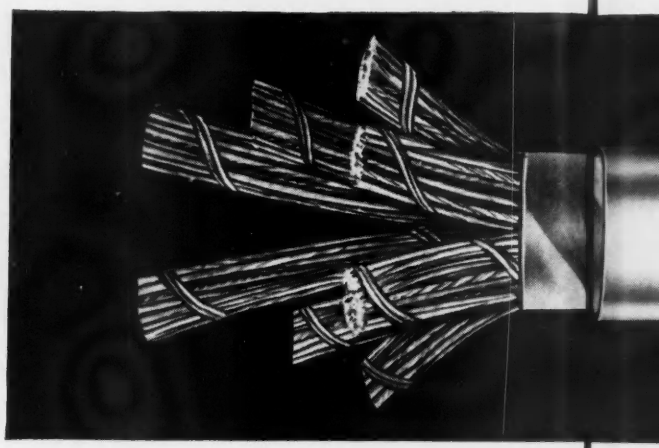
the only ground rods with the **Molten-Weld**



This microphotograph of the Molten-Weld shows how the grains of copper and steel interlock to form a permanent, continuous weld.

THIS CABLE SHEATH IS ALUMINUM





■ **light weight** ■ **great mechanical strength** ■ **low shield resistanc**
■ **extruded, seamless and impermeable** ■ **splice with wiped joint**

ALS and ALSP are made with the same high quality paper insulated copper conductors used in our Stalpeth and Lead sheathed cables...Core constructions include: paired-units, layers, quads, star quads, composites, combinations, video pairs, low capacitance.

19 Ga.	11 thru 101 pairs
22 Ga.	16 thru 202 pairs
24 Ga.	26 thru 303 pairs
26 Ga.	51 thru 404 pairs

For c
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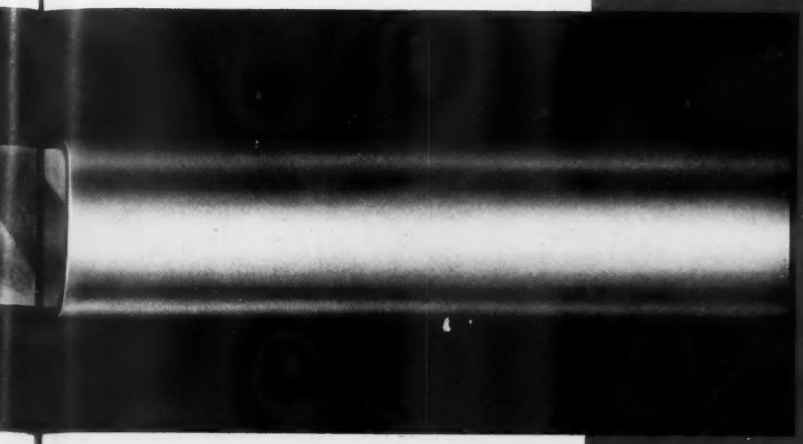
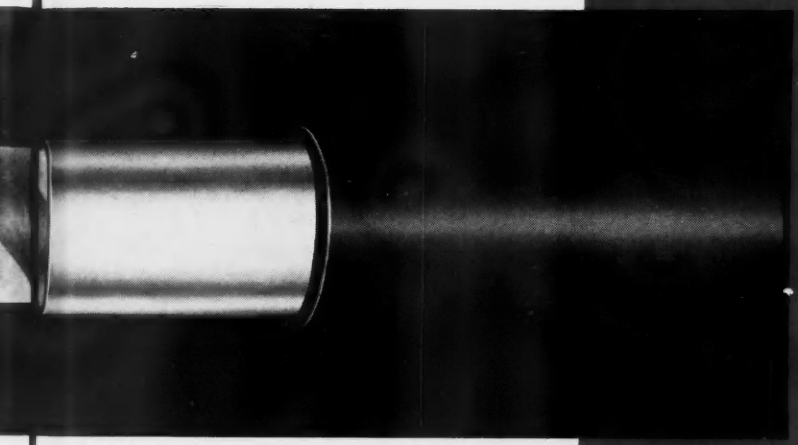
GENERA



ALS

(Paper Insulated—Aluminum Sheathed) for aerial use.



ALSP

(Paper Insulated—Aluminum Sheathed—Polyethylene Jacketed) for direct burial, duct or aerial use. Recommended for aerial installations involving marine atmosphere (sea coast locations) or industrial sites having air-borne concentrations of alkalies or chlorides.

For complete details, installation and splicing information telephone your nearest General Cable Sales Office or our distributors. Write Dept. T-9-10 for our new catalog "Extruded Aluminum Sheathed Telephone Cables."

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AUTOMATIC ELECTRIC SALES CORPORATION, Northlake, Illinois
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quality engineered... by

GENERAL CABLE

GENERAL CABLE CORPORATION, 730 Third Avenue, New York 17, N. Y. Offices and Distributing Centers Coast to Coast.

INDUSTRY OBSERVATIONS

By L. A. GRITTEN

Waitress vs. Telephone

MORE "Order meals by phone" services in restaurants have been reported. Harry P. Mahoney of York, Pa., tells us of a chain in Virginia and Washington, D. C. that gives kitchen service from telephones at tables and at parked cars. W. D. Comer of Gardena, Calif., describes a similar service in Mobile, Ala.

From T. Ryan of the Lincoln Tel. & Tel. Co. comes an interesting description of the services installed for the King's, Inc. chain in Lincoln, Neb. It appears that King's formerly used equipment they purchased outright, but it was not satisfactory. They called on the Lincoln Tel. & Tel., who developed a 2-position switchboard for the purpose in their own shops. The table or "drive-in" phones are equipped with buzzers for verification ring backs. The monthly rentals are $22 each for the switchboards and $1.60 each for the telephones. Two boards, with 116 stations, are now in service; another installation with 70 phones is under way; the system will be used in all King's restaurants. "The customer reaction," says Mr. Ryan, "is excellent."

No doubt there are other such installations elsewhere, but generally speaking it seems to be a profitable side line that our industry has overlooked. However, in fairness we should record an adverse opinion. One indignant objector asks: "Why are you trying to get rid of waitresses? Who wants to pat a telephone?" Too technical for us! We'll pass that one to the editor.

Battle Renewed

ANOTHER major Independent is added to the list of companies who have requested the regulatory commissions in their states to make mandatory the use of the U.S.I.T.A. Separations Manual in Bell-Independent toll settlements. West Coast Telephone Co. has filed a complaint against The Pacific Telephone & Telegraph Co., with the Washington Public Service Commission, to that effect.

The trend points inexorably to the end result that state commissions will control all toll agreements, that hitherto have been left to the companies to settle for themselves. This reversal of former policy may be regretted but the stiffening Bell attitude leaves the Independents with no alternative.

The A. T. & T. Company's circumvention of the U.S.I.T.A. Toll Settlements Committee makes the issue clear. If we expect fair treatment in regard to our most profitable service, we must get it with any weapons, political or otherwise, that will serve our purpose. If we intend to survive, we must fight.

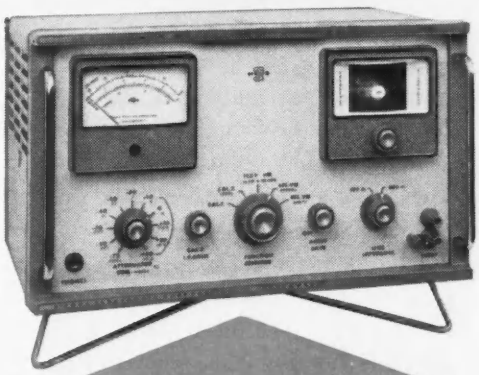
Fishy But True

FROM Eastport, Maine to San Diego, from Puget Sound to Key West, salmon, tuna, trout, bass, muskies, tarpon, catfish, all are biting — and the suckers

"CHARLIE," by Jim Counts

WHAT ARE YOU FELLOWS DOING, YOUNG MAN?
WE'RE BUILDING A POLE LINE, MA'AM!
WE'RE WHAT IS KNOWN AS A LINE GANG
TSK... TSK... AND SUCH NICE LOOKING BOYS... YOU WOULDN'T THINK THERE WAS A LIAR IN THE WHOLE BUNCH!
5-15
Jim Counts

New performance
New design
New appearance



TUNABLE, dual selectivity
plus
Flat VTVM feature

Sierra Model 125A

FREQUENCY SELECTIVE VOLTMETER

Model 125A is an all-new vacuum tube voltmeter incorporating features of several previous Sierra instruments in one compact, high-performance instrument.

Covering the frequency range of 3 to 600 KC, this new voltmeter has both narrow and wide selectivity settings plus a flat voltmeter position. This triple mode measurement capability makes the Model 125A an extremely versatile instrument for carrier measurements, wave analysis and general laboratory use. Brief specifications are listed at the side. For full information and demonstration, call your Sierra representative or write direct.

SPECIFICATIONS

Frequency Range
Tunable Mode: 3 KC — 600 KC
Flat Mode: 1 KC — 600 KC

Measurement Range
Tunable Mode: –90 dbm to + 32 dbm
Flat Mode: –30 dbm to + 32 dbm

Selectivity
Narrow: down 3 db 125 cps off resonance
down 45 db 500 cps off resonance
Wide: down 3 db 1.25 KC off resonance
down 45 db 5 KC off resonance

Construction
Modular with etched glass epoxy circuit boards

Data subject to change without notice

sierra

SIERRA ELECTRONIC CORPORATION

A Division of Philco Corporation

6307A PAGE MILL DRIVE • DAvenport 6-2060 • MENLO PARK, CALIFORNIA, U. S. A.
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Make "Your Own Phone Test"

to prove COMCO Cords the best buy for your entire system!

Nothing convinces like "in-service" performance, and that's where COMCO Cords excel! Making this test yourself is as simple as ordering COMCO Cords installed on your instruments, switchboards and intercommunications equipment. Their rugged reliability and noise-free conductivity will soundly attest to COMCO'S top quality cord designs and construction!

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From remarkable Spiraflex Retractile Cords, in standard or extended length (10, 15 or 25 ft.), with handset-matching, black or decorator colored P.V.C. jackets, to test and patch cords, COMCO meets every cord requirement. Almost without exception, you'll find the design and construction you want, the terminals and strain reliefs you need, among cords that COMCO stocks for immediate delivery. Special cords to your specifications are swiftly available, too. Start your test of COMCO service and cord performance by ordering for your own equipment, today!

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Northlake, Ill.

who fall for gaudy lures in the sport stores bite hardest of all. It is time for our TRUE FISH STORY.

Depoe Bay, Oregon faces the open Pacific Ocean. Waves straight from New Guinea, 7000 miles away, surge between rocks through a narrow opening into a tiny harbor. You can charter a boat and catch salmon; and getting out of and back into that harbor may be much more thrilling than the fishing. Or you can stand on the rocks and catch cod.

John and Mary, telephone people on their honeymoon, fished from the rocks. Mary landed a big cod. Soon her dainty hands were slimy. Her brand new wedding ring slipped off and bounced into ten fathoms of angry sea. There was nothing to do but shed a tear and buy another ring.

Almost exactly a year later, they spent a weekend at Depoe Bay. They fished from the same spot. Mary caught a big cod. At the motel, she cooked it for their dinner. At her very first mouthful, she bit on something hard. Wondering, she removed it from her mouth — and there between her fingers lay a piece of fish bone.

Who Reads Bill Inserts?

ALLAN R. STACEY'S article on bill stuffers (TE&M 4-1-60) interests and provokes. Controversies as to how many people ever read a bill insert have been raging for decades without definitive conclusion. They are as futile as the arguments about the authorship of Shakespeare's plays, why a Praying Mantis eats her lover, or who put the overalls in Mrs. Murphy's chowder.

Estimates range wildly between the "more than 80%" quoted by Mr. Stacey and pessimistic statements that fewer than 2% ever take them from the envelopes. We gravely distrust both extremes.

New York Bell Tel. Co. surveys, we are told, showed that 25% of the customers read their inserts. Robert A. Baker, Seattle, an authority on mail order selling, regards even that as overly optimistic. He adds, however: "If you can average around 10% readership, you are doing a good job and more than justify the cost of printing and stuffing."

There is one infallible method of ensuring that your bill insert will be widely read: Make a mistake. One ludicrous error will be read and reported back to you by everyone in your community. For example, some years ago the Chamber of Commerce in a small western city put out a folder, which was supposed to include this statistic: "60 per cent of Scandinavian descent." As printed, it read: "60 per cent of Scandinavians decent."

Are We In The Wrong Business?

Scene in telephone office:

Customer: "My phone dials wrong numbers all the time."

Manager: "What do you do about it?"

Customer: "I've been using the phone next door."

Manager: "Fine. Keep on doing that. There's no way we know to fix your dial. That will be $5 please."

Customer: "What on earth for?"

Manager: "Professional advice."

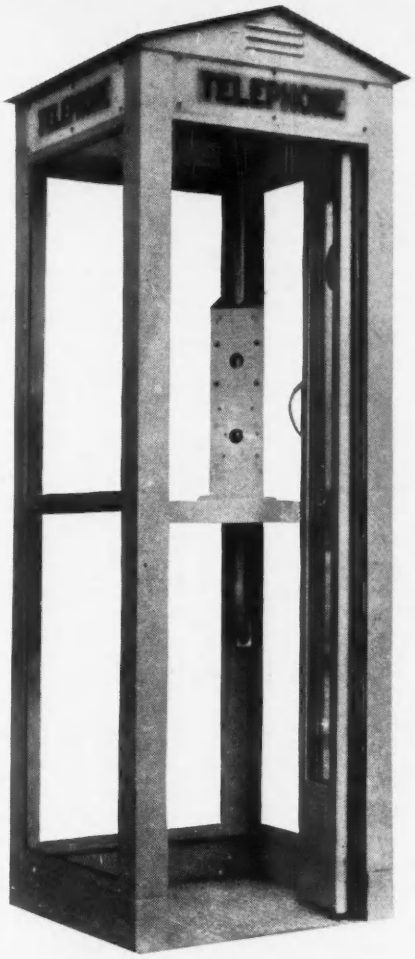
That could not happen, of course. But this has happened to us and a few million others: We go to our doctor and tell him the sad story about our arthritis. He tells us, what we've heard before, that the medical profession knows neither the cause nor the cure for the malady, so "just keep on as you are, taking lots of aspirin." In due course, he sends us a bill — and we pay it.

Teachers And Gadgetry

ONE SCHOOL teacher taught three boys who later became presidents of the United States. He was Archibald Campbell. He taught in a little school near Fredericksburg, Virginia.

The boys were George Washington, James Madison and James Monroe. Campbell lacked the splendid buildings stuffed with gadgetry that make up most of the cost of education today. Perhaps, if he had been compelled to conform to the requirements of modern curricula, his pupils might have accomplished less.

— *Leslie A. Gritten.*



SAVE
RECONDITIONED SHERRON
OUTDOOR TELEPHONE BOOTHS

* Reconditioned Baked Epoxy Aluminum Finish.
* One-Half Price of New.
* Wire Glass All Around.
* Plexi Glass Telephone Signs and Ceiling.
* Latest 40 Watt Circline Light Fixture.
* Paystation Mounting with Corner Shelf and Wire Ducts.
* Construction: Zinc Coated Cold Rolled Steel with Safety Plate Floor.
* Folding Door with Stainless Steel Track and Bronze Roller Bearing.
* Shipped All Assembled for Your Location.

Folks, the above Sherron Booths were in service several years and required refinishing or repairs. I purchased the lot and have really rebuilt the units like new. Refinished with the latest rust-resisting "Epoxy" Aluminum Paint baked on, New Signs and Light Fixture. A true Value at a great Saving. We will pay two-way freight if unsatisfactory. Have standardized on Aluminum finish to copy the Reynolds and Alcoa styling.

We have a limited quantity, but will accept orders for a future late shipping date. All shipments are F.O.B. our plant.

PRICE — MODEL 1 A, with Peaked Roof, as pictured $195.00
with Flat Roof, add $15.00

"CALL COLLECT ANY TIME"

BOHNSACK EQUIPMENT COMPANY

Germantown, N. Y. LEhigh 7-6213

TYPE 16-B MULTI-STATION 7-CHANNEL CARRIER
is your low-cost answer!

Budelman Type 16-B Carrier will:

- Provide additional circuits on existing multi-station lines.
- Provide additional circuits on new multi-station lines.
- Improve service on existing multi-station lines.
- Provide new circuits to new stations in areas beyond the 1200 ohm loop.
- Provide additional trunks to remote PBX, PABX, or key telephone systems.

FULLY SELECTIVE 10-PARTY DIVIDED RINGING
SEMI-SELECTIVE 10-PARTY BRIDGED RINGING
SINGLE FREQUENCY CODED RINGING

all this without additional wire lines — without disturbing existing services!

7 Channels — 10 to 140-kc freq range. Applicable wherever attenuation at carrier frequencies does not exceed 35-db.

Write for Bulletin 259-D — or call us

BUCKEYE TELEPHONE & SUPPLY CO.
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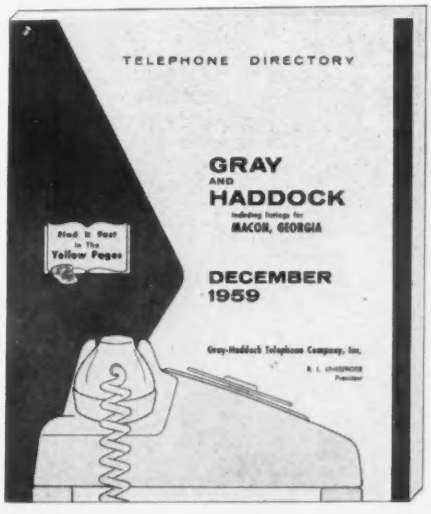


A Directory for the
Gray-Haddock Telephone Company, Inc.

Printed by
R. R. Donnelley & Sons Company
350 East Twenty-second Street, Chicago 16

Revenue immediately increased 51 per cent at this booth in Platea, Pa., when General Telephone replaced the old style unit with an Alcoa outdoor installation, proving that customers definitely prefer aluminum's brighter, cleaner appearance.

"REVENUE OFTEN INCREASES 50% OR MORE WHEN WE SWITCH TO ALCOA BOOTHS,"

Reports T. J. Schultz, General Commercial Manager, General Telephone Company of Pennsylvania

"Since 1955 we have purchased 177 Alcoa outdoor booths and every one of them has more than paid its way in increased revenue, lower maintenance expense and reduced vandalism damage," says Mr. Schultz.

"An example of the way booths of Alcoa Aluminum boost revenue is this installation in Platea, Pa. Ever since we switched from an old style booth to an aluminum unit and moved the installation a few feet closer to the highway, revenue has shown an average increase of 51 per cent a month.

"Upkeep costs have also gone down since we started installing aluminum booths. Because they are corrosion resistant, occasional washing and sweeping is all that is needed to keep them clean and attractive. And vandalism, too, has been greatly reduced . . . thanks to the excellent lighting and sturdy construction of Alcoa booths."

Like many other companies, General Telephone of Pennsylvania has found Alcoa outdoor booths a sound investment and a sure road to an immediate increase in revenue. Why not find out how Alcoa booths can do the same for you? Write for free brochure and ask your jobber to show you the Alcoa Goodwill Kit—the free promotional package to help you merchandise the new booth to your customers. Aluminum Company of America, 1721-D Alcoa Building, Pittsburgh 19, Pa.

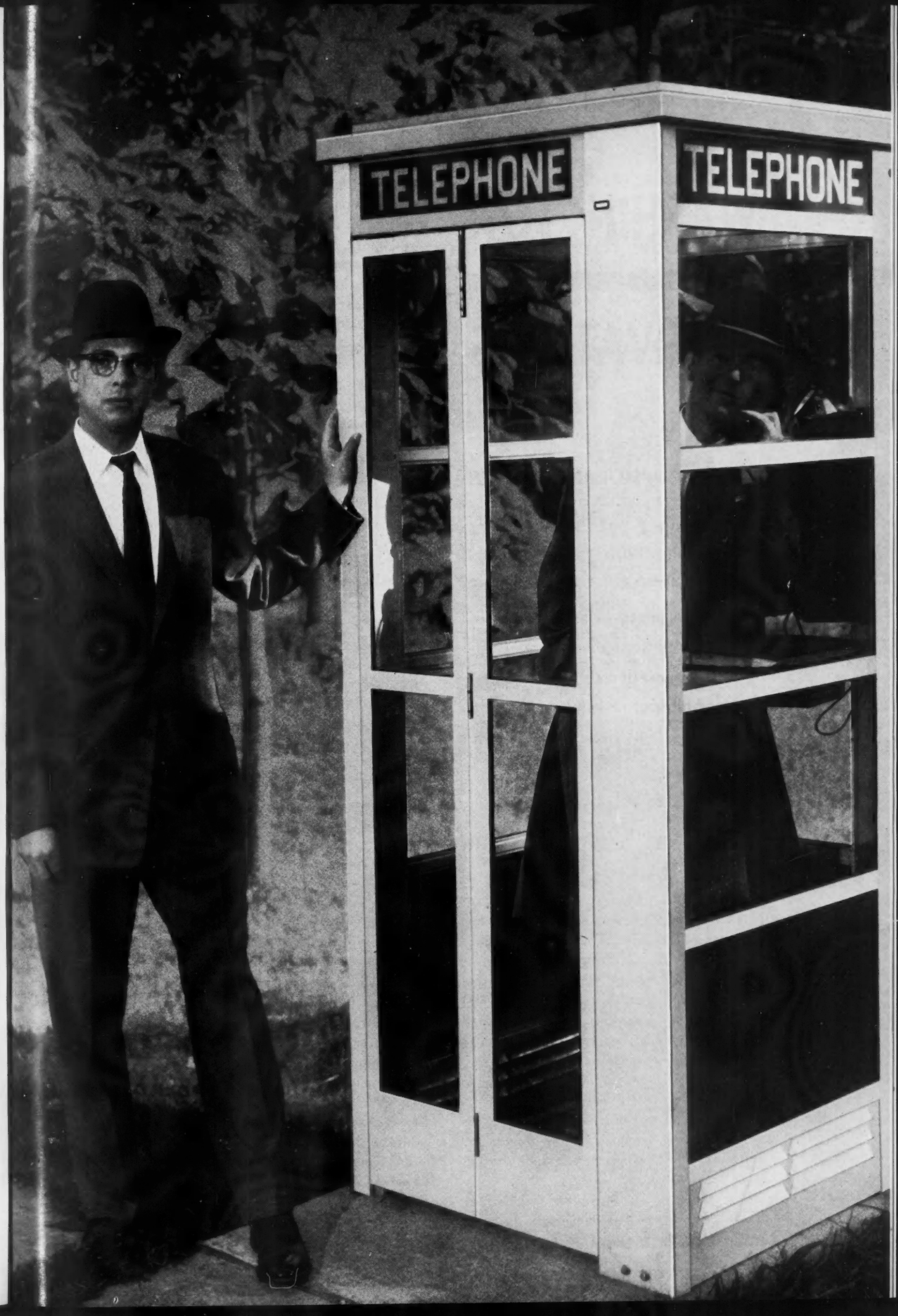
Maintenance costs went down for General Telephone of Pennsylvania when it began using outdoor booths of Alcoa® Aluminum. Occasional sweeping and washing with soap and water is all that is needed to keep them smart and new looking.

"People like the lighting in Alcoa booths," says Mr. Schultz. "Excellent lighting and sturdy construction give a feeling of safety at night!"

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and "Alcoa Theatre" alternate Mondays, NBC-TV


TELEPHONE
TELEPHONE

WASHINGTON OBSERVATIONS

By ROLAND DAVIES and FRED HENCK

Ohio hearings on methods of computing toll settlements and compensation carry additional weight as pioneer or pilot proceeding on toll compensation.

AS FREQUENTLY happens, one of the events of the most importance to Washington observers of the communications scene these days is taking place some distance away from the nation's capital.

This is the hearing before the Ohio Public Utilities Commission on the complaint of the General Telephone Co. of Ohio, asking that the commission order the Ohio Bell Telephone Co. to use the methods outlined in the U. S. Independent Telephone Association separations manual to compute toll settlements and compensation to be paid to General of Ohio.

The sessions were held for two days late in April, to permit six spokesmen for General of Ohio to put in their direct testimony. The hearings were due to resume May 24 for cross-examination.

While the Ohio case is significant by itself, it carries additional weight as the pioneer or pilot proceeding on toll compensation across the country. The General companies in Florida and Kentucky have filed similar complaints against the Southern Bell Telephone & Telegraph Co., and the West Coast Telephone Co. has submitted a filing against the Pacific Telephone & Telegraph Co. in Washington.

In the Ohio hearings, the General witnesses have urged computation of toll compensation and settlements under a separations method in which the amount of exchange circuit plant investment would be allocated to both intrastate and interstate message toll telephone service on the basis of relative minutes of use.

After the General of Ohio witnesses had declared that it is not feasible to apply the message-mile-minute basis of apportionment to exchange wire plant, Ohio Bell moved that the commission direct a mileage study of General exchange circuit plant, to determine the mileage ratio on exchange and toll calls. It declared, in recommending the loop mileage study, that the American Telephone & Telegraph Co. has developed a feasible method of carrying out such a survey. The commission, it was suggested, could direct Ohio Bell to carry out the project, or order a joint study.

General of Ohio replied that such mileage has not been studied previously, and that Ohio Bell in effect was proposing a new method of separations. Noting that the Bell proposal was for allocation of exchange circuit plant on a message-mile-minute basis, it declared that allocation of exchange circuit plant has always been on a message-minute basis in separations formulas, and added that injection of mileage into the picture would not be in accordance with accepted separations practices.

The commission took the motion under advisement, and indicated it would rule before the next hearing session.

Witnesses for General of Ohio were the company's President, Clare E. Williams; operating Vice President F. W. Hamper; Richard L. Ohlson, General Telephone Corp. Service Corp. assistant to the vice president-revenue requirements; Mervin H. Alexander, USITA Toll Engineer; Neal C. Hasbrook, California Independent Telephone Association Secretary-Treasurer; and Forrest R. Stroud, Jr., Chief Engineer of General of Ohio.

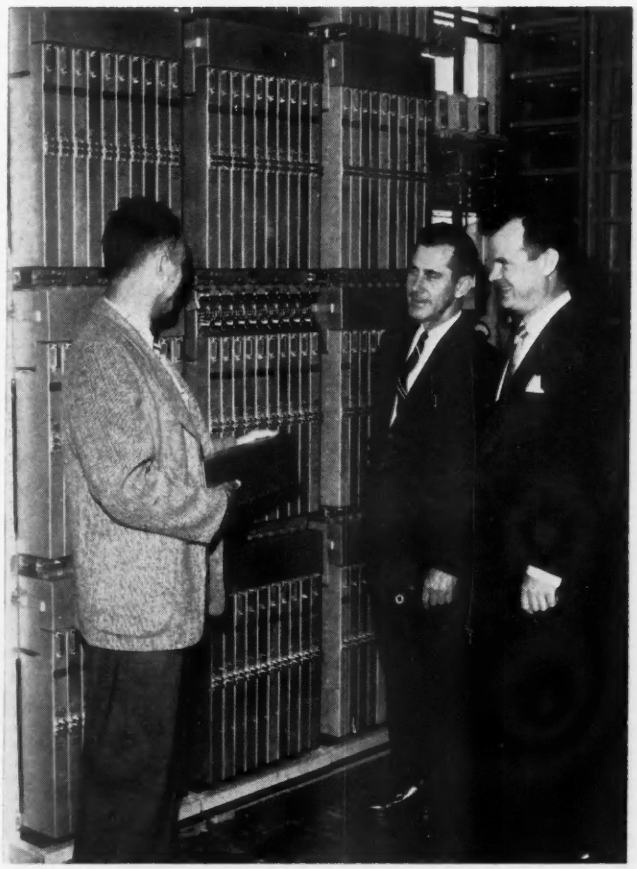
The General of Ohio spokesmen did not specify how much additional money they are seeking in toll compensation from Ohio Bell, and the question was not asked during the initial sessions.

However, Mr. Stroud offered cost studies which he said demonstrated that the General company's revenue requirements for handling toll business interchanged with Ohio Bell for the year ending Dec. 31, 1958, was $4,411,830 for intrastate business and $1,436,188 for interstate business, or a total of $5,848,018.

During this same period, Mr. Williams testified, General of Ohio actually received slightly more than $4,000,000 in compensation for business interchanged with Ohio Bell, of which about $3,400,000, or 70%, involved intrastate business.

GENERAL TELEPHONE COMPANY
OF THE NORTHWEST

Improves Service in the Richland-Kennewick Washington Area with a 50% saving by use of Panhandle Type X Transistorized Cable Carrier Installation



Mr. Wayne Reamer describes the operation of the X Transistorized Cable Carrier to Supply Supervisor, Art Anell and Central Division Manager, Clarence Crow. Application of Panhandle's X Carrier between Kennewick and Richland over existing cable will permit E.A.S. service and toll additions in the 25,000 station complex area. 200 channels of X will be placed in service at cut-over in May.

PANHANDLE

PANHANDLE ELECTRIC SALES, INC.
P.O. BOX 248, ARLINGTON, TEXAS
Distributed By
INTERNATIONAL TELETRONICS, INC.

SO EASY TO HANDLE
WB Telephone Wires

Convenient, knockout cartons make WB Telephone Wires easy to handle in storage and on the job . . . protect the wire until it is used . . . Color-coded labels mean easy identification of wire types.

WB WHITNEY BLAKE CO.

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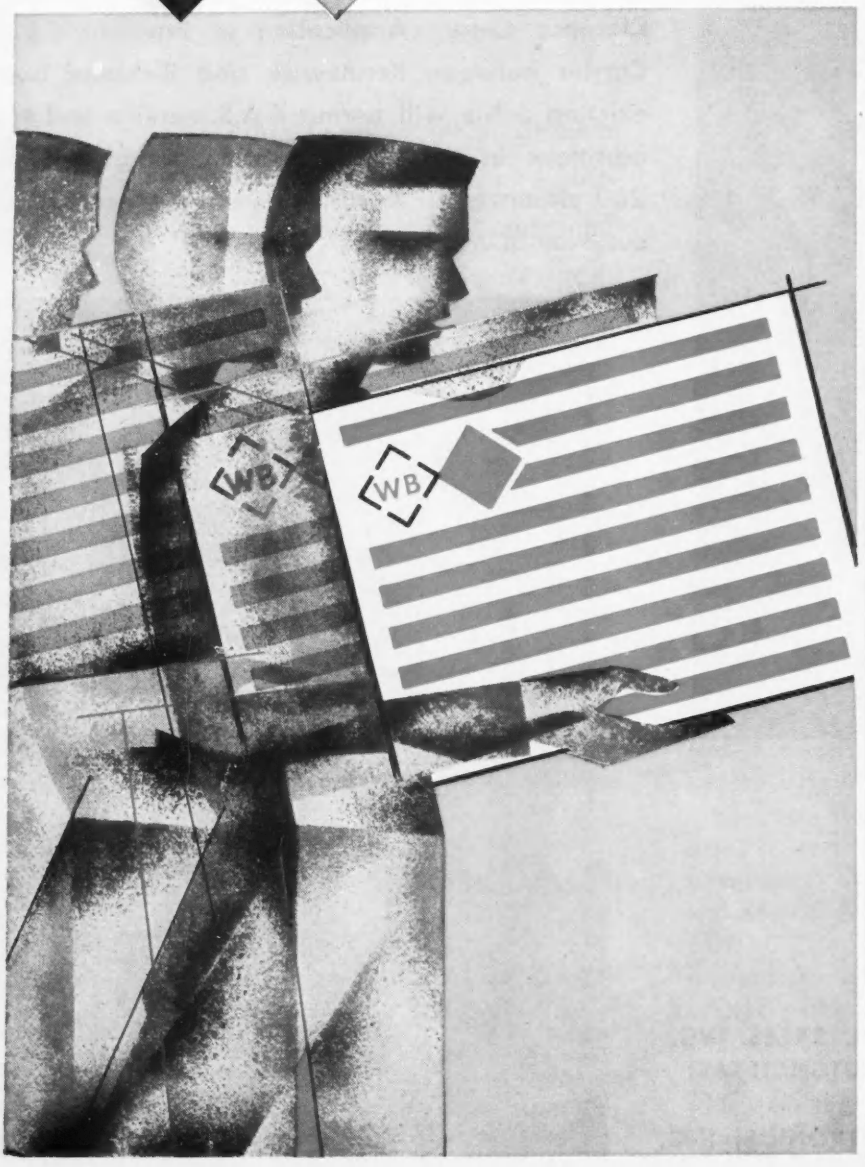


MEMBERS of Senate Interstate & Foreign Commerce Committee, who regard the FCC as almost their own child, set off a drumfire of criticism of the Commission at the confirmation hearing of Commissioner Robert E. Lee, who is in the process of winding up one seven-year term, and has been nominated for another one.

Despite the hostility expressed for the FCC as a whole, and the fact that the timing of the expiration of Mr. Lee's term is politically poor from his point of view, there appears to be general agreement that he probably will be confirmed by the Senate for another term, starting July 1 and running until June 30, 1967.

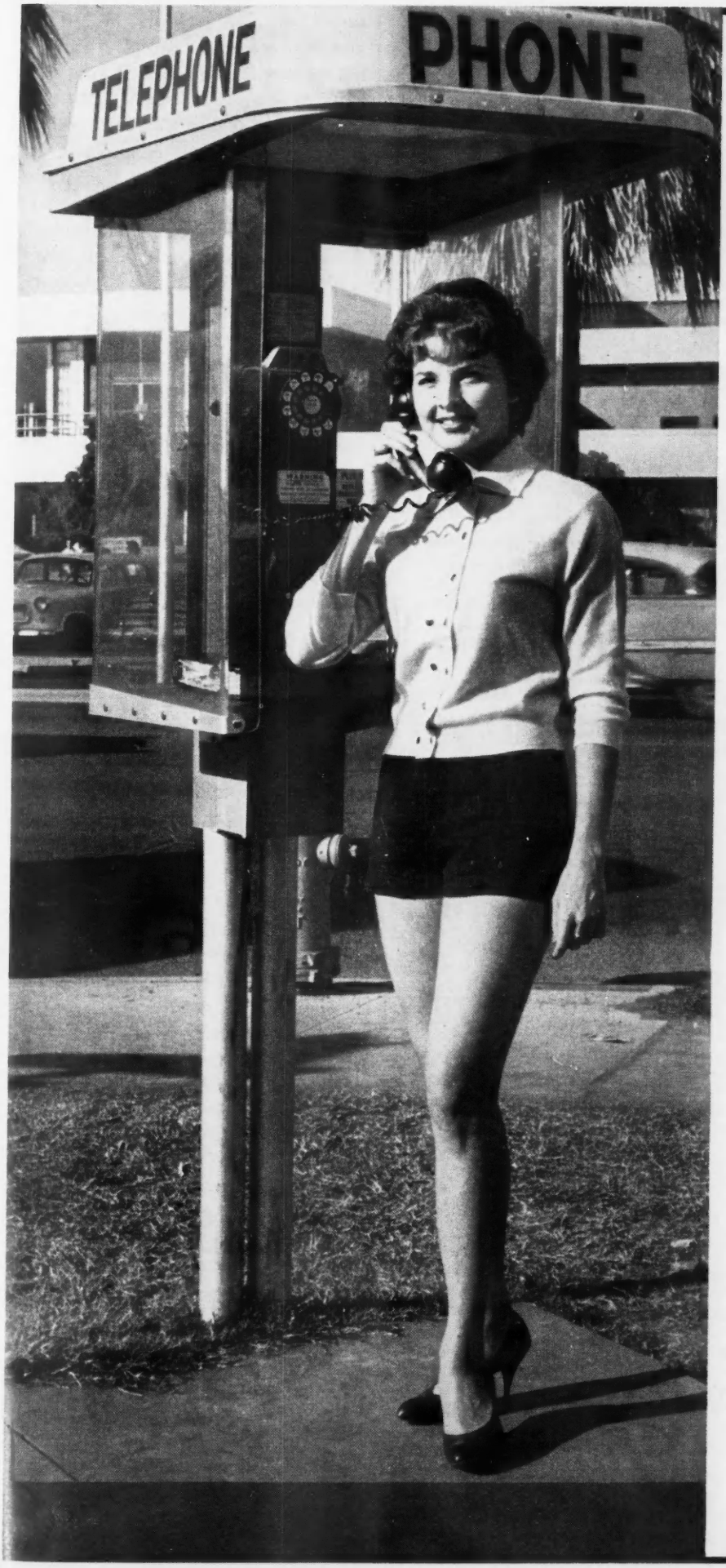
It has been pointed out from time to time that the Democratic majority in the Senate may hold up the nomination, on the theory that if the Democrats win the Presidential election this fall, they will immediately have a vacancy to fill with their own men. Under the law, no more than four of the seven FCC members can be from one political party, and there are now four Republican Commissioners, including Mr. Lee.

Also not an open-and-shut confirmation cinch, as this was written, was Edward K. Mills, Jr., former Deputy General Services Administrator, who has been named to succeed former Chairman John C. Doerfer for the remainder of a term expiring June 30, 1961.

Mr. Mills is suffering at the moment from an embarrassment of riches. He is a widely respected public servant; a successful attorney; former Mayor of his native city, Morristown, N. J.; and a Republican with considerable political backing.

However, the Communications Act provides that Commissioners can have no financial interest in any activity in the area regulated by the FCC, and Mr. Mills, leaning over backwards to avoid any possible charge of conflict of interest, finds himself in a rather peculiar position.

He and Mrs. Mills have sold the stocks they held personally of companies engaged in the communica-



She's cool and comfortable... and You collect!

Here's a hot scoop on a cool young lady! As reported in the ARIZONA REPUBLIC, this lovely young miss finds telephoning a pleasure at this newly installed Outdoor Telephone Canopy — newly installed, that is, by the Mountain States Telephone and Telegraph people in Phoenix, Arizona. They are as pleased as punch that they can finally replace the "hot box" booth with the cool, clean and comfortable GLADWIN OUTDOOR TELEPHONE CANOPY!

LOW IN COST . . .
HIGH IN QUALITY . . .

Gladwin's Outdoor Telephone Canopy affords protection from heat . . . assures privacy, visibility, and minimum street noise.

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BY GENERAL INSULATED WIRE WORKS, INC.*

*Licensed to manufacture under existing patents.

Telephone cord sets of proved performance backed by General Insulated's unmatched experience and know-how in the manufacture of quality telephone tinsel cordage:

Spiraflex **HANDSET CORDS** in bright colors with non-staining thermoplastic jackets in solid color extrusions matching color shade and sheen of telephone sets. Also non-staining black Neoprene jacketed cords. Both types available with or without integral moldings and terminations. Furnished in standard or extra long lengths.

STRAIGHT HANDSET AND DESK SET CORDS are available in non-staining thermoplastic constructions in matching colors and in black Neoprene.

GENERAL INSULATED WIRE WORKS, INC.

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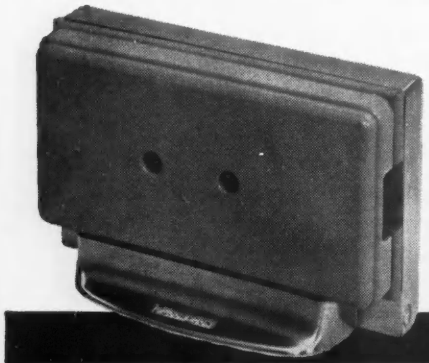
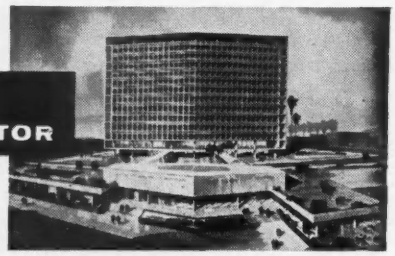


FLOOR-CON

. . . outmodes all other methods of telephone installation

Model No. 104 — shown with standard telephone equipment — accommodates up to 8 No. 44-A Western Electric connecting blocks (4 on each side). Model No. 102 takes up to 6 (3 on each side), or if desired, the back of the Floor-Con can be used for external ringers, buzzers, or auxiliary equipment. This allows the desks and furniture to be free from all telephone equipment.

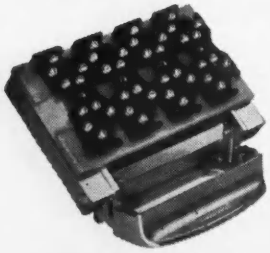
TELEPHONE FLOOR CONNECTOR



BEAUTY — clean lines and modern design

UNIFORMITY — provides standardized connections throughout

ECONOMY — phones can be completely installed prior to building occupancy



The fabulous FLOOR-CON allows phones to be connected entirely independent of office furnishings. Furniture may be moved or replaced without incurring expensive telephone changes. Gone are the clutter of equipment from desks and walls, and the needless marring of furniture.

Approved and specified by telephone companies, FLOOR-CON is used exclusively in many large buildings in business, industry and government. Attaches to all types of underfloor ducts and floor boxes, or fastens directly to the floor. Comes in four plated finishes to match the decor of the office.

FLOOR-CON — simplifies telephone connection service.

PAT. NO. 2854166

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Telephone: MAdison 4-5400

tions field. But it seems Mr. Mills and his brother also are life tenants in a trust set up by their late father. They receive the income from the trust as long as they live. The income then goes to their children. But, meanwhile, they have no control whatever over what stocks are bought and sold, and they receive no capital gains — just the income. The trustee, a Morristown bank, has sole control.

Mr. Mills has twice requested the trustee to dispose of stocks which could prove embarrassing to him. When he took over GSA's Transportation & Public Utilities Service, he asked the trustee, and the trustee agreed, to sell the American Telephone & Telegraph Co. stock in the trust. When he was appointed to the FCC, he renewed the request, this time in connection with all communications stocks.

The trustee thereupon sold stock in the General Telephone & Electronics Corp. and Radio Corp. of America held by the trust, but refused to sell stock of the General Electric Co. and the Westinghouse Electric Corp., for price and tax reasons. The trustee contends that he would be violating his responsibility as a fiduciary if he sold the shares specified at this time.

In any event, it was decided to throw the problem into the lap of the Attorney General. A ruling on the applicability of the section of the Communications Act prohibiting financial interest to a trust such as the one benefitting Mr. Mills was asked, after which the hearings will be resumed.

THE COMMUNICATIONS Workers of America is the latest organization to launch an intensive campaign aimed at repeal of the 10% excise tax on communications services.

In a letter to all locals, John L. Crull, CMA Vice President, urged union members to promote a letter-writing program, not only within the union but with other company employes and with neighbors, friends, and other contacts, to persuade Con-

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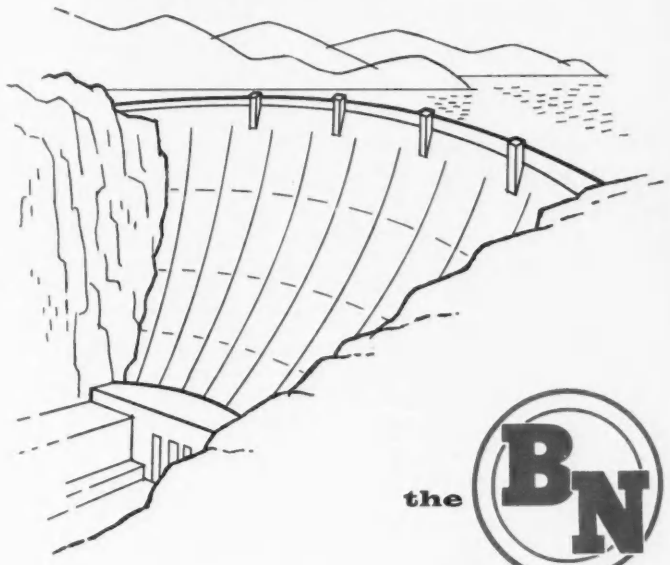
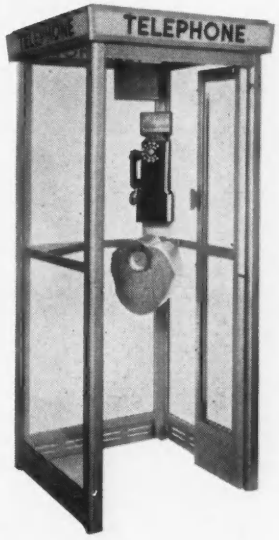
BEST for strength





Strong, extruded aluminum posts, tempered glass and porcelain enameled steel panels provide exceptional strength and durability.

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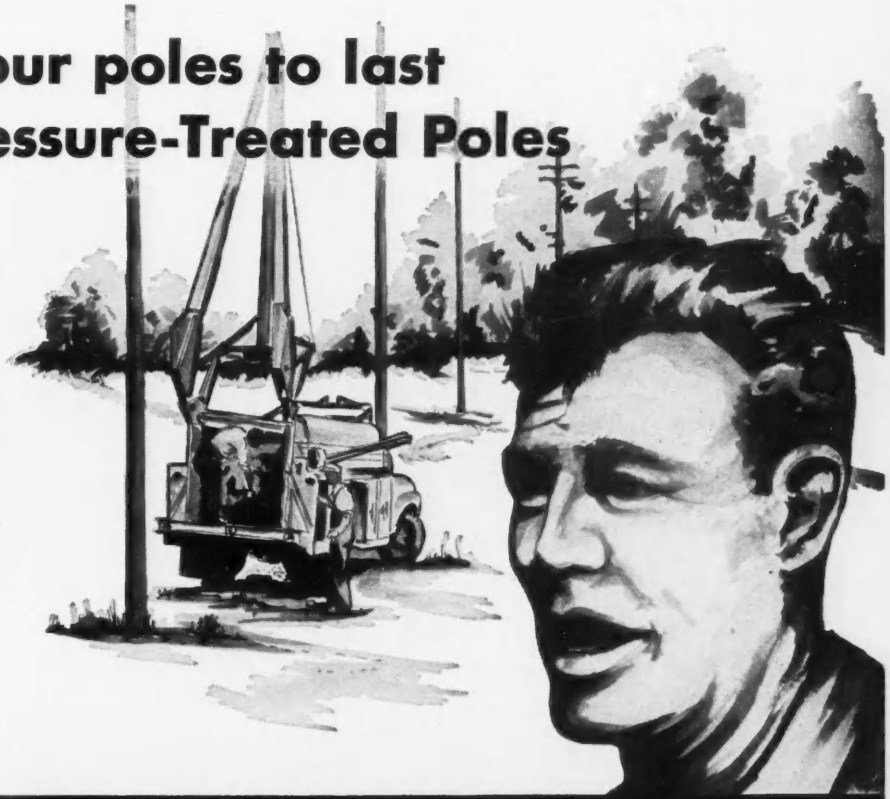
If you want your poles to last
Specify T-C Pressure-Treated Poles

Every pole bearing the T-C brand has received the best in preservation. "The T-C Treatment" makes them last, and give you generations of trouble-free service. Our pressure treating process (and we think you'll agree) is the best yet developed by modern Technology ... and, only the best chemical preservatives are used. That's why we can say—Specify T-C and get the best in preservation.



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PLANTS AT SPARTANBURG, SOUTH CAROLINA AND WILMINGTON, NORTH CAROLINA

The same Leich phone, on wa

The kitchen telephone, what an important decision! Wall or counter top? With the Leich 100 telephone the installer and the housewife can decide intelligently, on the spot—*and use the same telephone either way.*

This wall, counter top versatility cuts your stocking problem too. Only from Leich do you get this exclusive feature . . . and there's a choice of 11 colors to harmonize with any decor.

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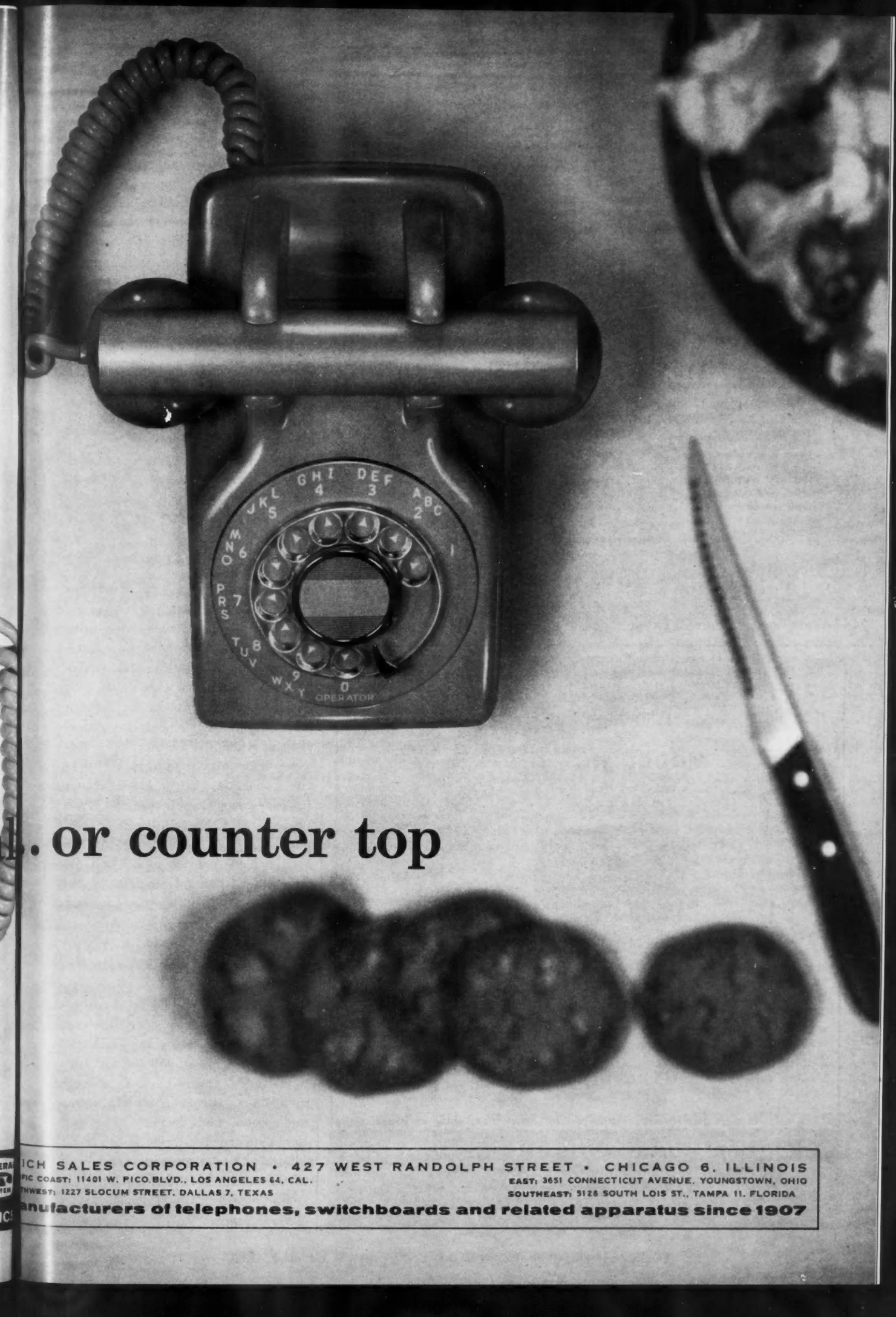

..or counter top

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CONTAINING FOUR TO SEVENTY-SIX COILS

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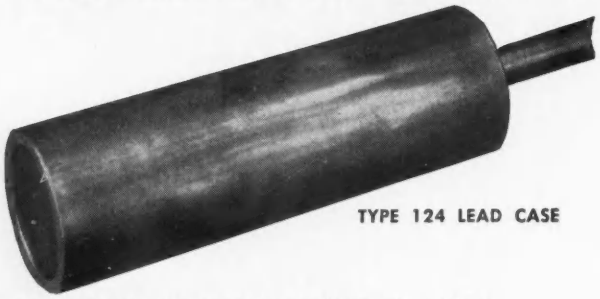

TYPE 124 LEAD CASE

- LEAD STUB ASSEMBLIES ARE ARMOURED AND PRESSURIZED AND
- PLASTIC STUB ASSEMBLIES ARE ARMOURED AND SEALED IN THERMOPLASTIC COMPOUND TO INSURE PROTECTION FROM MOISTURE.

These assemblies can be equipped with voice frequency coils, Types C632 (88 MH) and C638 (44 MH) coils are for subscriber loading. Types C642 (88 MH) and 641 (44 MH) coils are available for use on quadded inter-office and toll cables. (Also available with MF10 and MF11 units.) Special Coils can be made to meet other requirements.

Write us for assistance on your loading problems.

CEECO loading coils are sold by your telephone equipment supplier.

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reduce trouble reports

MODEL RC
DEHYDRATOR
automatic in operation

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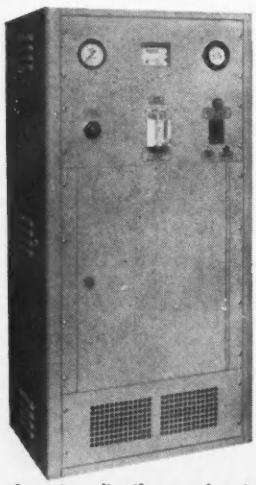

- Completely automatic in operation
- Automatic drain and Power Failure Relay
- Incorporates the latest safety features

Exchange equipment designed to supply chemically dry air for telephone cables, aerial and underground, this unit can supply as many as 50 cables. It is equipped with volume recording air meter, high and low pressure alarm switches, humidistat and hour meter.

S & G developed the Dry Air Dehydrator used extensively by many operating companies to protect telephone cables from moisture. Many hundreds of these units are now operating satisfactorily and economically.

order through your favorite distributor, for information, write or phone

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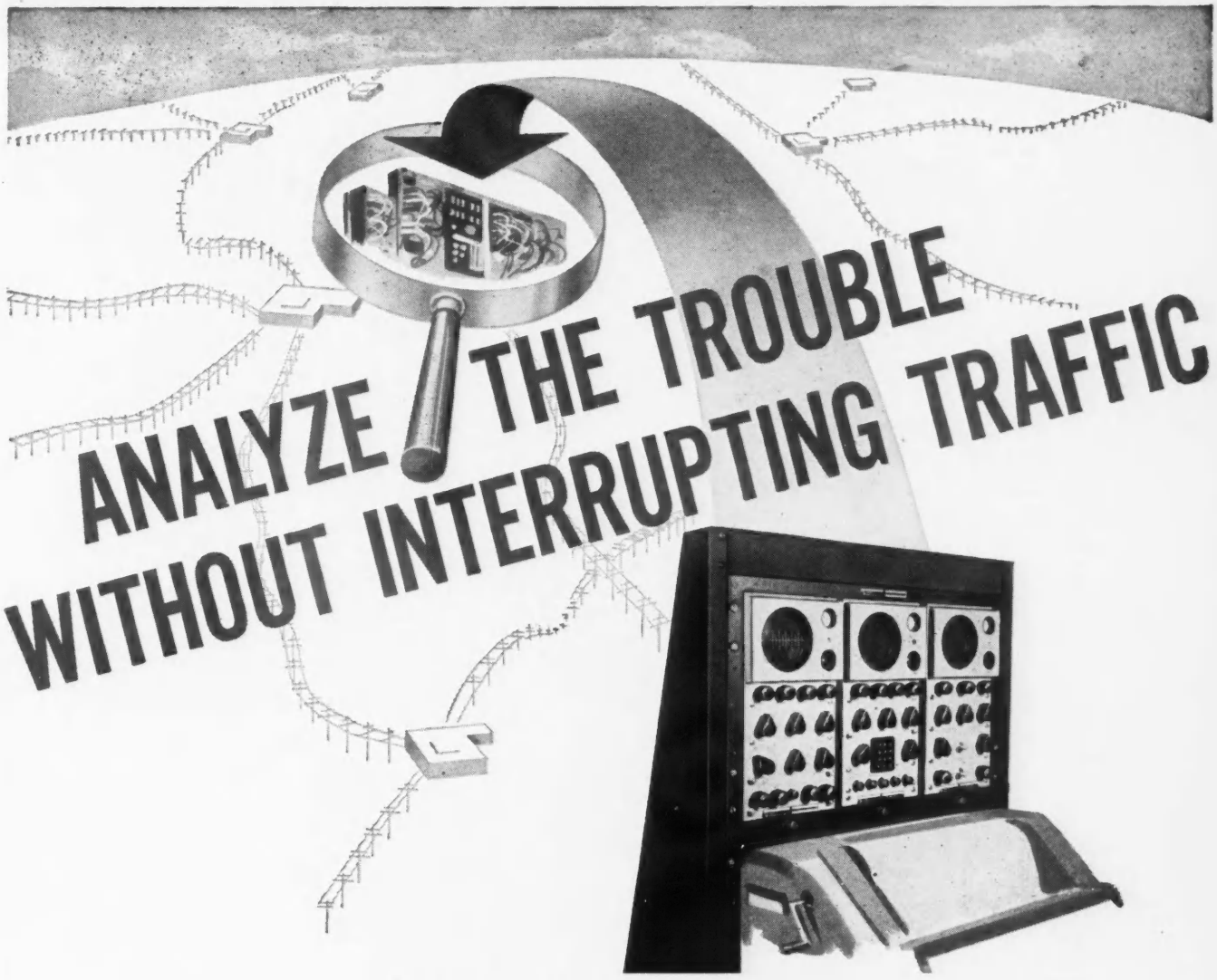
gress that they should end the tax.

"In the interest of the welfare of CWA members, the telephone, radio, and cable companies by which they are employed, and the general public, this unfair tax should be repealed," Mr. Crull said. "The net result would be a 10% reduction in the cost of all such service. This would encourage expanded use of local, long distance, and other message services, and enlarge employment opportunities in the industry."

During the two years of the 86th Congress, 106 bills have been introduced to repeal, terminate, or reduce communications excises. President Eisenhower has asked Congress to rescind its action of last year which would repeal the 10% excise on local telephone service only as of June 30, 1960.

NEWS NOTES: The General Services Administration has received FCC permission to intervene in a current hearing involving rates of the General Telephone Co. of the Northwest for supplemental equipment in connection with pulse data transmission, for use at air defense installations. A prehearing conference is scheduled for May 17, with some hope expressed that the case can be settled without a hearing. A similar proceeding before the FCC involves the California Water & Telephone Co. Here again, optimism has been voiced that the issues may be ironed out without a hearing. Another similar case set by the Commission for hearing also has ended in a compromise settlement.

As May began, the FCC was expected to act soon on pending petitions by common carrier organizations to reconsider its over-all microwave policy decision, in which the Commission looked toward virtually unrestricted licensing of private microwave systems. The FCC, it was understood, had decided to reopen the case for a brief period to permit interested parties to put in evidence of the need for frequencies for space communications. — *Roland Davies & Fred Henck.*



how to reduce down-time on telegraph and data transmission circuits

Radiation's new Telegraph Distortion Monitoring System (TDMS) provides in one compact assembly complete testing, monitoring and signal waveform analyses of telegraph circuits and data transmission lines. This versatile unit makes possible on-line quality control of communications links. It indicates malfunctions, analyzes their causes—without interrupting the flow of traffic.

The Radiation TDMS, with miniaturized components for space-saving compactness, can replace most test equipment now required for teletype maintenance and monitoring. Thus, in addition to reducing circuit outage, the TDMS permits reduction of test equipment costs and increases maintenance efficiency. Portability is achieved at the "push of a button".

For a detailed description of the operation and capabilities of the TDMS, write for Brochure RAD E-100B. Address Radiation Incorporated, Dept. T3, Melbourne, Fla..

THE ELECTRONICS FIELD ALSO RELIES ON RADIATION FOR . . .

RADIPLEX—50—channel low-level multiplexer with broad data processing applications. Features rugged solid-state circuitry, almost unlimited programming flexibility, unique modular construction for compactness and exceptional ease of operation and maintenance.

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TELEMETRY TRANSMITTER—Model 3115 is a ruggedized 215-260 MC unit with extremely linear FM output under the most severe environmental conditions. With its record of outstanding performance in many missile programs, Model 3115 is specified by leading missile manufacturers.

See our display at the AFCEA, Booths S-72 and 71; or at the National Telemetering Conference, Booth N-3.

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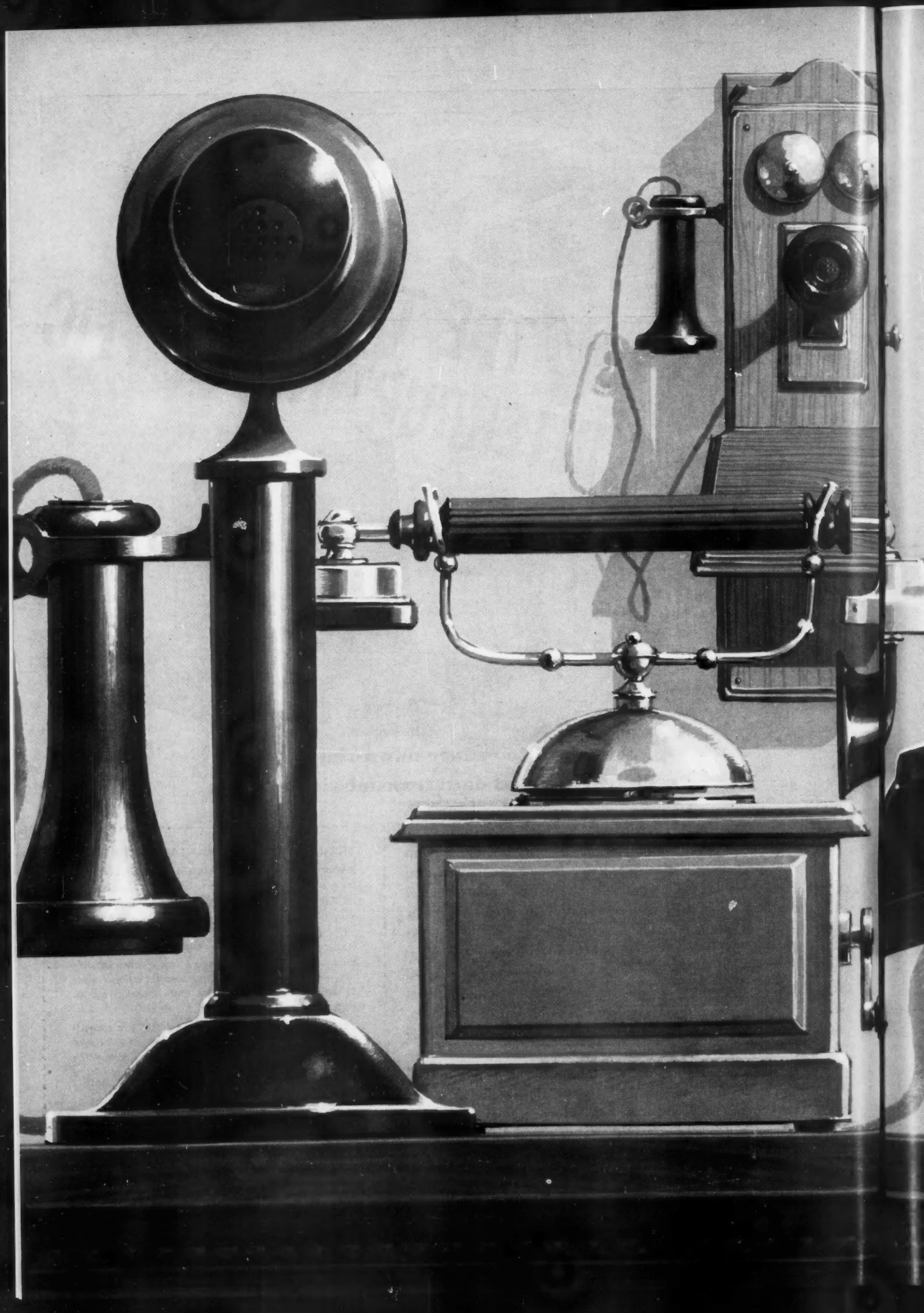

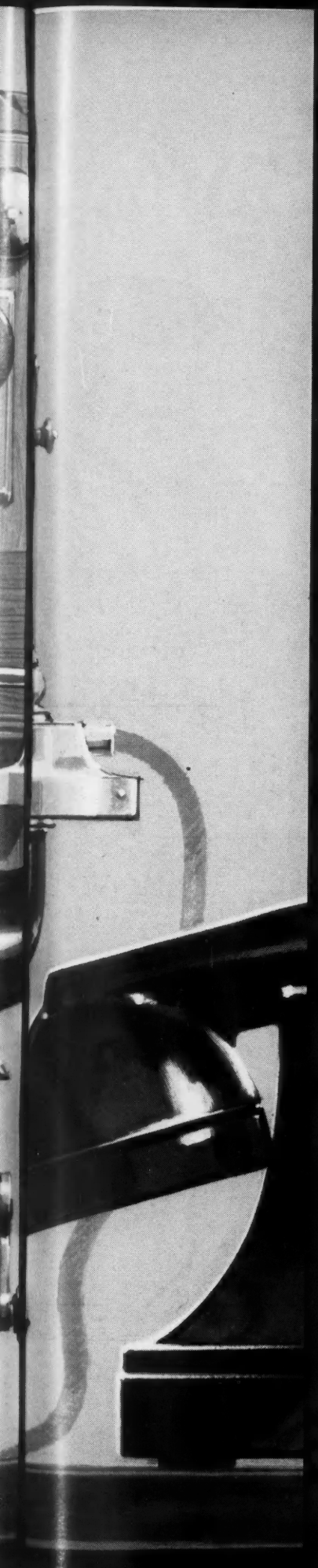

Are you operating a telephone company or an antique shop?

Remember the "old" telephones? Where do you see them today? In antique shops! They are collectors items—museum pieces—nostalgia nudgers!

And what about the telephones you're buying today? If you're buying Ericofons, you're getting the only modern telephone on the market. If you're still buying old-fashioned two-piece phones, you're buying "built-in obsolescence"—it's only a matter of time now before these phones, too, become "antiques," museum pieces. The Ericofon will still be modern long after "today's" phones are only memories!

Next time you buy telephones, stop and think—think hard—do you want to buy instruments that are **already becoming obsolete?**

When you order telephones, order Ericofons—the only modern instruments in the world today—and available only from

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

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Bring your expansion

oblems to Kellogg...

there's a Kellogg Carrier System that will fit your needs

Faced with expansion problems that seem to spell only costly capital outlays? That's what many telephone management men feared—until they spoke to Kellogg. Then Kellogg experts showed the way to improved, expanded service at *less cost* than by conventional means, because of the versatility and economies of Kellogg Carrier Systems.

Among these systems, there's certain to be one that can bring new savings to your expansion program:

K-24—Kellogg's revolutionary new low cost short haul cable carrier. No more expensive cable work between exchange offices. K-24 does the job on existing cable pairs.

K-31—Rural Subscriber Carrier. Provides up to 8 additional lines on an existing pair of wires! And now system mileage can be *doubled* with one low-cost Kellogg repeater . . . *tripled* with two repeaters.

K-32—Trunk Carrier System. Same features and modern electronic circuitry as the K-31, but for open-wire service between central offices.

Hundreds of installations throughout the U.S. prove the reliability and serviceability of Kellogg Carrier. Each system is built for long trouble-free service according to the most critical standards of the industry.

For complete details and technical information, or an appraisal of your carrier needs, fill in the coupon below.

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...for motels an

Hotels and motels can no longer rely on service "like the kind you get at home" to bring back guests again. Guests want MORE than that.

A telephone system is a good example. Can a guest dial another room without going through the operator? Can he, by dialing just *one* digit, get the PBX operator? Can he get the hotel garage, room service, or maid service by one-digit dialing?

These are examples of the extras offered by leading hotels and motels.

All of these extras, and others, are available to you with Stromberg-Carlson's PBX systems. Here are some examples.

On trunk calls, your system can be arranged so that a guest can dial one digit to get an outside

pusiness for you

PBX service "tailor-made"

and hotels

line, then dial the complete number himself. Charges on all calls are automatically tabulated.

Direct-dialing toll calls can't confuse the picture. Toll restrictors in the system eliminate this worry. But they don't interfere with local calls placed directly by guests. Guests can make toll calls easily. It's merely a matter of dialing a single digit to reach the public exchange toll operator and having her complete the call.

Here's another big plus. When an outside party calls a guest who is out, there's no need for the switchboard operator to ring the guest's room repeatedly until he returns. With Stromberg-Carlson's PBX system, a light switches on in the guest's room next to the telephone. When he returns, he knows by the visual signal that the PBX operator has a message for him.

Is this Stromberg-Carlson system versatile? You bet it is! It can fit into *any* motel or hotel situation. Additions are easy and can be made at any time.

Want more information? We'll be glad to supply it without obligation. Just call your nearest Stromberg-Carlson representative.

In Atlanta call TRinity 5-7467; Chicago: STate 2-4235; Kansas City: HArrison 1-6618; Rochester: HUbbard 2-2200; and in San Francisco call OXford 7-3630.

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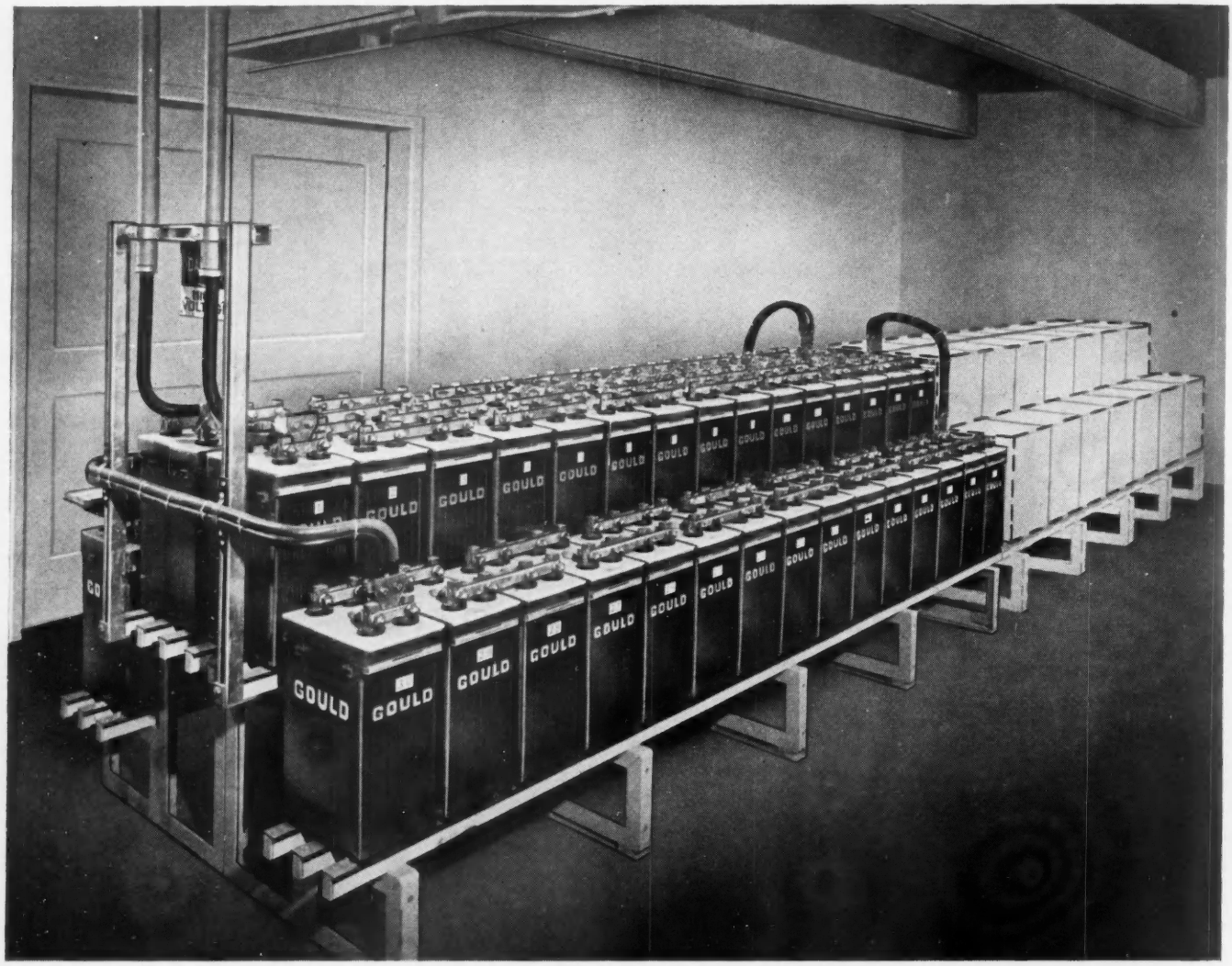
A DIVISION OF **GENERAL DYNAMICS**



Save 30 to 40% floor space . . .

. . . with new GOULD Stationary Batteries

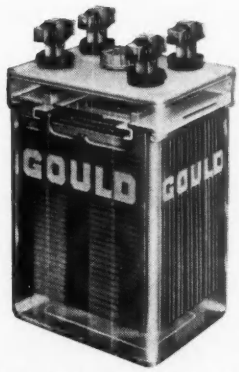
Gould Stationary Batteries in Plastrite Jars save you 30 to 40% floor space. This means you can increase your battery room capacity without increasing the room size!

Gould Stationary Batteries in Plastrite Jars are lighter, easier to handle. Higher tensile strength protects the jars from shipping abuse. Higher elongation characteristics, greater resistance to heat prevent warping and bulging.

Gould Stationary Batteries have a new Silicone O-ring post seal which prevents escape of electrolyte . . . new stronger posts assure full current carrying capacity . . . new element suspension eliminates cover breakage due to weight of battery element.

Gould Stationary Batteries in Plastrite Jars are available in Planté, Calcium, or Kathanode. Write for details today, or call your local Gould office listed under "Batteries—Industrial" in the Yellow Pages. Gould-National Batteries, Inc., Trenton 7, N. J.

In Canada, write to Gould-National Batteries of Canada Ltd., 1819 Yonge Street, Toronto, Ontario.



New Stationary Batteries in Plastrite Jars offer the same long life for which Gould has always been famous.

More Power to you from **GOULD**

EDITORIAL

"Dateline—Washington, D.C., July 1"

EARLY IN the month of April the nation's newspapers advised their readers that President Eisenhower had signed a bill reducing the *Cabaret Tax* from 20 to 10 per cent.

This bit of news was not headlined. In fact, we were pleasantly surprised when one of our hometown newspapers, *Chicago's American*, did publicize the tax cut with an editorial headlined — "*Surprise — A Tax Is Cut!*"

Editorially the paper pointed out that from May 1 on, "*a night out on the town will cost considerably less than it has.*"

"*This may or may not cause you unrestrained joy, depending partly on your age,*" said *Chicago's American*. "*We think it's excellent news, tho, because it proves, contrary to a lot of evidence, that Congress really can lighten a tax now and then.*"

"*The 20 per cent cabaret tax,*" the editorial continued, "*was one of the wartime excise taxes imposed as emergency revenue-raising measures. Like other such taxes, it stayed in effect after the emergency was over because the government could not bring itself to part with the money it brought in — about 20 million dollars annually.*

"*Congress still couldn't bear to do away with the tax completely, as it should have. (In the same way it reduced the utterly indefensible 'luxury' tax on telephone users but still hasn't abolished it.) But at least it curbed its tax appetite long enough to give the taxpayers a break.*

"*The good news would be even better if there were some indication that some unnecessary federal spending would be cut out to compensate for the loss of revenue, but no doubt that would be asking too much.*"

We have no quarrel with the Chicago *American's* editorial. But despite its reference to the "*Utterly indefensible luxury tax on telephone service,*" we do believe the editorial should have raised another question — and that question is: — "*Why does Congress persist in grouping telephone service with jewelry, furs and liquor and thereby set it apart as the one essential necessity classed as a luxury and therefore subject to a tax that is nothing more or less than a luxury sales tax?*"

Perhaps we are a bit slow in grasping some of the things that happen in Washington. But we admit we do not see any resemblance between the telephone business and the jewelry, fur and liquor businesses.

Unlike jewelry, furs and liquor, the telephone is not a luxury. It is an everyday necessity and, as such, it should rightfully be classed as an essential service right along with water, gas, electricity and heating fuel, and immediately removed from the luxury classification which makes it the only essential service in this country subject to a luxury sales tax.

Already Congress has seen fit to lessen the tax load on those who pick up the tabs at the nation's cabarets. And, while reducing the tax load for the cabaret group, Congress has been instructed by President Eisenhower to rescind the telephone excise tax repeal action of 1959 and continue the tax on both local and long distance calls.

While we do not begrudge the cabaret goers one cent of the tax reduction recently handed to them by Congress we do think it is high time *Congress quit playing favorites.*

Also, since Congress has by its recent reduction of the cabaret tax proved it can reduce a tax, we believe it is important that every telephone user in this country write his or her Congressman and demand that he actively support legislation aimed at ending a tax that singles out and penalizes a telephone user with a 10 per cent levy.

Somehow we believe the telephone users of this country have the power to make the 10 per cent excise tax on telephone service end on June 30 as promised. If they put that power to work, the newspapers on July 1 may headline the fact that after 18 years Congress has ended the "*Temporary tax*" on telephone service. That's one headline we hope we will see, and we feel sure it will be more important to the telephone users of America than the reduction of the Cabaret Tax!

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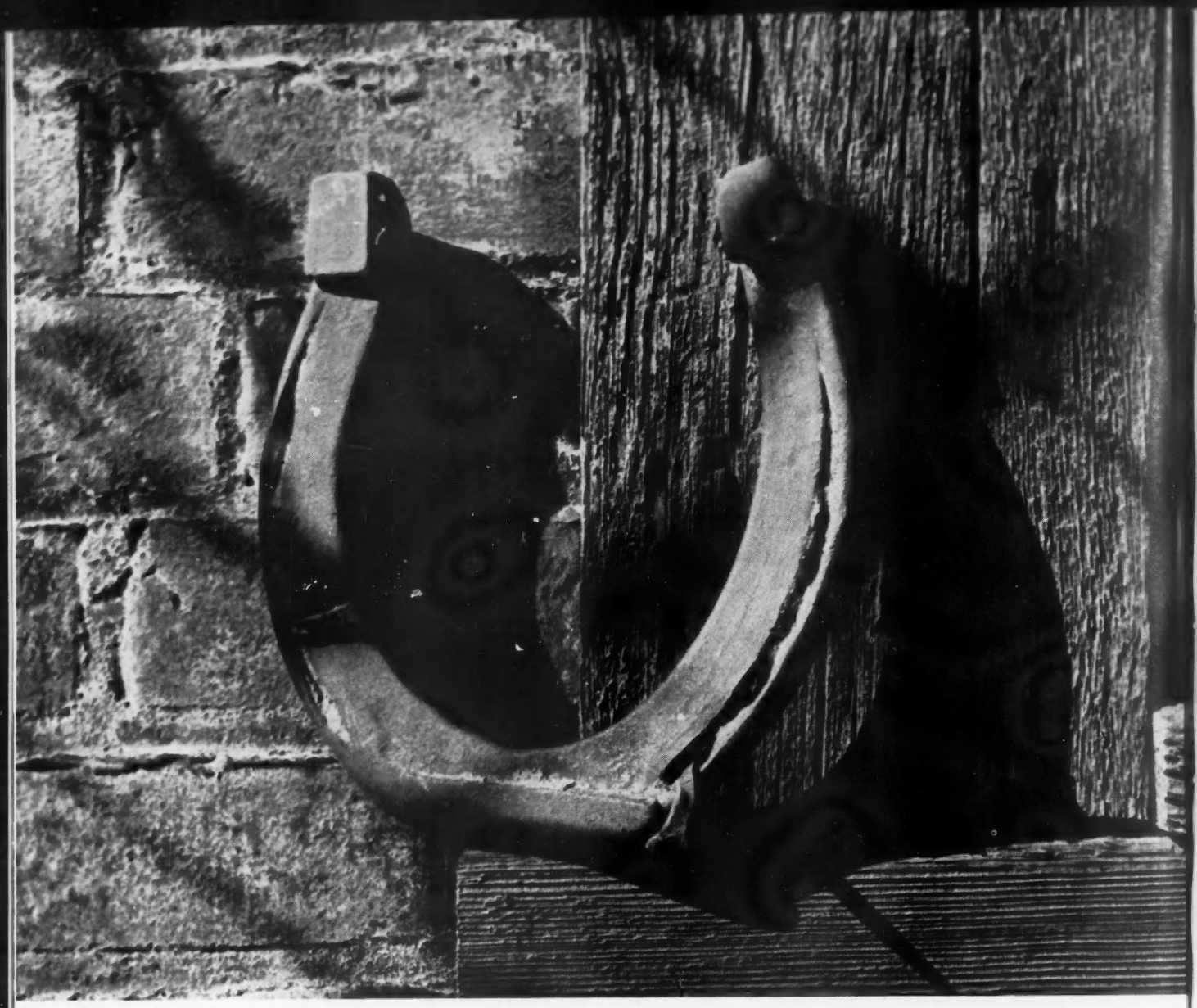

"Remember the missing horseshoe nail?"

JOE: How are you, Don? What can I do for you?

DON: Remember the old story about the missing horseshoe nail? It kept a king from getting to the battlefield on time—so he lost the battle *and* his kingdom! Well, Joe, I feel a bit like that king myself!

JOE: You mean you're in trouble unless you get some small supply items in a hurry?

DON: Exactly. So you'd better get me 150 C-clamps . . . 350 plastic splicing sleeves . . . 400 nicopress sleeves . . . a dozen rolls of two-inch tape . . . 100 half-inch plastic cable guards. And Joe—I'll be in town tomorrow morning, so I'll come over for the order.

JOE: Fine, Don. It'll be ready.

DON: Boy—I'm sure glad you're so well stocked and located so close by!

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By MARION BEATTY

Member,
Kansas Corporation Commission,
Topeka, Kansas.

Principles of Regulation

PART THREE OF A SPECIAL TE&M ARTICLE

THE PUBLIC utilities commission of many states exercises great power over great industries. It is regularly pressed for decisions involving huge sums and decisions that may affect the ability of the enterprise to survive and serve. Its decisions must be based on facts, principally accounting and engineering facts. For example, in a public utility rate case some of the factors to be considered are:

(1) *How much does the company have invested in the business that is used and useful in serving the public?*

(2) *Did the company pay too much for the property?*

(3) *If the state is one that recognizes present fair value or gives some weight to it, what is that value and how was it determined?*

(4) *What are its revenues and its operating expenses? Are salaries, advertising, payments to affiliates or other expenses excessive?*

(5) *Should the commission recognize as operating expenses certain unusual outlays or a reasonable allowance for contributions?*

(6) *Are depreciation rates proper?*

(7) *How much must be set aside for interest on debt? What will it cost the company to finance its future debt requirements?*

(8) *Is the company proposing an expansion program or in the process of one which will affect its need for capital?*

(9) *Should the rate of return on the rate base be 5, 6 or 7 percent?*

(10) *What return will the proposed revenue provide on equity?*

After the company pays federal and state income

taxes, what does it have left for surplus and division among stockholders? Is it a fair return on the stockholders' investment or is it so little that the stockholders will shy away from telephone investments and let the company go to pot and our good service with it?

These are some of the many complicated factors to be weighed, and the above is an overly simplified summary of them. If we went much further herein and tried to explain the effects of accelerated depreciation or what relative weight should be given to original cost and reproduction cost rate bases, although this is regular diet for top utility executives, the average reader might say as Mark Twain did, "The more you explain it, the more I don't understand it." Or he might just say, "To hell with it." Commissioners are sometimes tempted to take this latter way out themselves.

Rates Not Based on "Druthers"

THE Commission's decisions must be based on accounting and engineering, cost of money, needs of the subscribers and other such factual evidence, not on the "druthers" of commissioners, ratepayers or voters, and —

(1) *Not on which lawyers are representing the company or the protestants and whether they happen to be cronies of the commissioners;*

(2) *Not on whether the townspeople want the train to keep running just to hear the whistles, when they may not ride it once a year;*

(3) *Not on how many persons sign petitions opposing a utility rate increase (the people can always outvote the utility if we are counting noses);*

(4) *Not on the personality of the company managers and whether they happen to be friends or good fellows;*

(5) *Not on how unpopular the action will be or how many votes it is likely to make or lose.*

Uninfluenced by string pullers, gratuity givers or influence peddlers, a utility commission must establish rates that are reasonable and fair to the utility and the ratepaying public.

One of the problems challenging utilities and regulatory commissions arises out of the growth of our population. Our population is increasing rapidly and we need new schools, new stores, new sewers, new highways — new everything. This same growth places upon utilities the obligation to rebuild and enlarge facilities to serve the new demands.

"The utilities' problem is to remain able to supply its products to communities in the volumes desired by them, at prices that are not in excess of the value of those products and as much under that as it can manage, but nevertheless at a price under which new capital funds will flow freely into its industry. Only then can it cope with continued growth and change."(5)

Since the time of the first telephone exchange in New Haven, Connecticut, in 1875, the public has been demanding more and better telephone service. It complains if the company does not improve and expand and do it as soon as the service is needed. All of this is in spite of the fact that the telephone business is one of those industries in which there is an increasing cost per customer served. Yet there are some portions of the public who object to a rate of return that will interest investors and attract new capital, new capital that is necessary for those improvements and expansions.

If a couple of personal experiences may be pardoned, I wish to cite them to illustrate a point. It starts with a letter I received from a farm woman who was comparing farm income with telephone income. She pointed out that she and her husband do not receive any guaranteed 6% return on their investment. I am still close enough to farm mud and dust and some lean years when we lived on corn bread and beans, side meat and greens to be sympathetic with that farm woman.

One legislator who constantly harasses me about telephone rates demands better service and lower rates. I'm for that too, but we do not have the power of the Man who fed the multitude with five loaves and two fishes. However, some utilities have been accomplishing some of the better service at less cost over the decades if you consider the lessening value of the dollar.

While mentioning some complaints against telephone companies that may not be justified, let us mention several that may be lest we be accused of being brainwashed, bought and sold:

(1) One complaint which a few managements may be guilty of is that of throwing everything possible into the rate base and then wanting the ratepayer to pay 6 or 7% on it.

(2) Some customers complain that their company makes them pay for Cadillac-type service when all they need is Chevrolet type. On the other hand, there are some customers who want to hang on to their model-T service and object when management wants to go to dial at increased charges.

(3) There are a few family companies where members of the family are padding the payroll.

(4) It does appear that REA money grows on trees and instead of borrowing no more than is needed as they would from a bank, some are shaking the tree for all there is on it. These are some of the things for which regulatory commissions must watch.

Commissions are often accused by irate ratepayers or politicians of favoring the big utilities, and their competence is sometimes impugned by accusations that big profits or windfalls are overlooked and that the commission is deceived as to the utility's true financial condition. It would be foolish to say that this is never true.

In the case of the little commission and the big utility, the rate case may be a contest between David and Goliath. The ratepayer may be represented by David, consisting of a commission staff of a small number of accountants, engineers and lawyers and they may be also underpaid. A large utility company sometimes spends a quarter of a million dollars to prepare a case. A famous telephone case in New York some years ago cost

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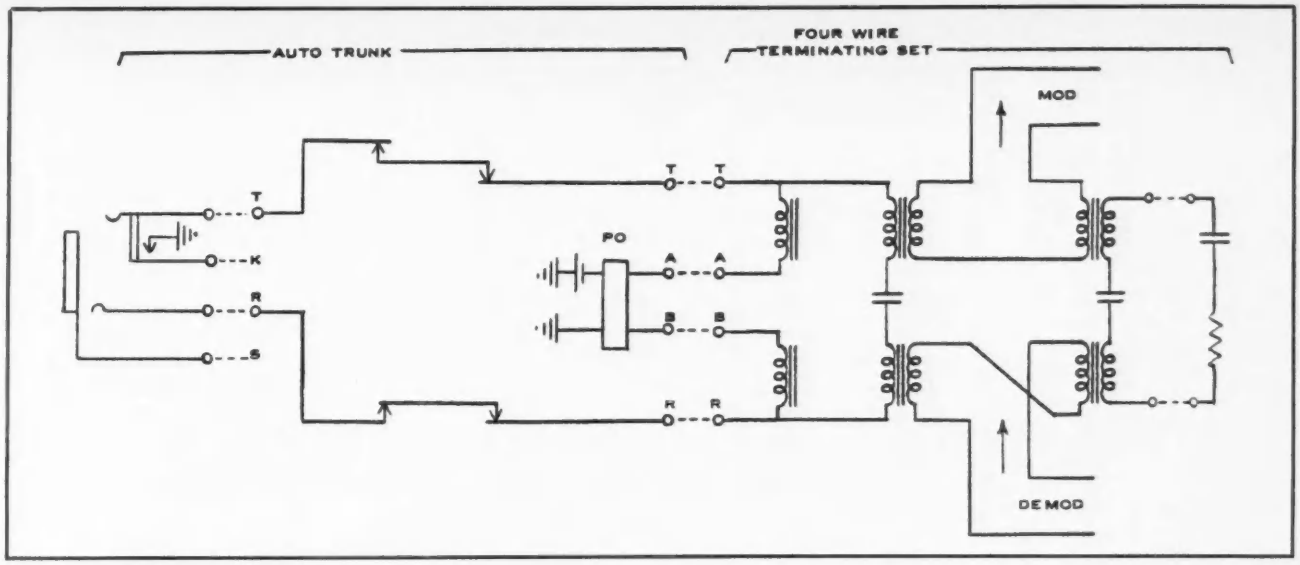

FIGURE FIVE: — Section of a trunk circuit arranged for A and B leads connected to a four-wire terminating set.

Coordination of Carrier

and Inter-Toll Switching Equipment

By E. V. HIRD*

The concluding section of Mr. Hird's article discusses: (1) the use of "A" and "B" leads; (2) pulsing considerations; (3) voice transmission; and (4) voice circuit drop levels. (Part One of this article appeared in the Mar. 15 issue of TE&M.)

Use Of A and B Leads

THE DESIGNATIONS "A & B" leads have particular significance in inter-toll switching systems. *Figure Four* indicates that the A lead is the d.c. return path from the tip and B, the d.c. return path from the ring of a repeating coil. The condenser in the mid point of the repeating coil allows the voice to pass through but effectively blocks any d.c. path between the tip and ring leads.

Another standard method of deriving "A & B" leads is shown in *Figure Five* in which retard coils, having a low resistance to d.c. and a high reactance to voice frequencies, are used to provide a d.c. path from the tip to the A lead and from the ring to the B lead. The d.c. isolation of the tip and ring is obtained by the condenser in the four-wire terminating set.

Figure Five also illustrates a portion of a trunk circuit connected to a four-wire terminating set arranged for A & B leads. Loop dialing from the toll operator's cord circuit operates relay PO to pulse out on the M lead to the carrier terminal. This type of pulsing is normally used by toll switchboards not arranged for sleeve control. The term "sleeve control" is illustrated in *Figure Three* in which throwing the dial off normal opens the sleeve lead and, in turn, places the PO relay directly on to the ring of the line.

Another illustration of the use of A & B leads could occur in *Figure Three* if the retard coils were removed

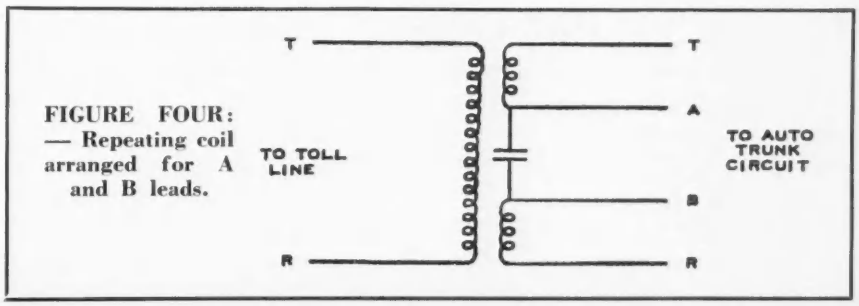

FIGURE FOUR: — Repeating coil arranged for A and B leads.

**Mr. Hird is mgr., comm'l. projects (EFSI), Lenkurt Electric Co. of Canada, Ltd., Vancouver, B. C., Canada.*

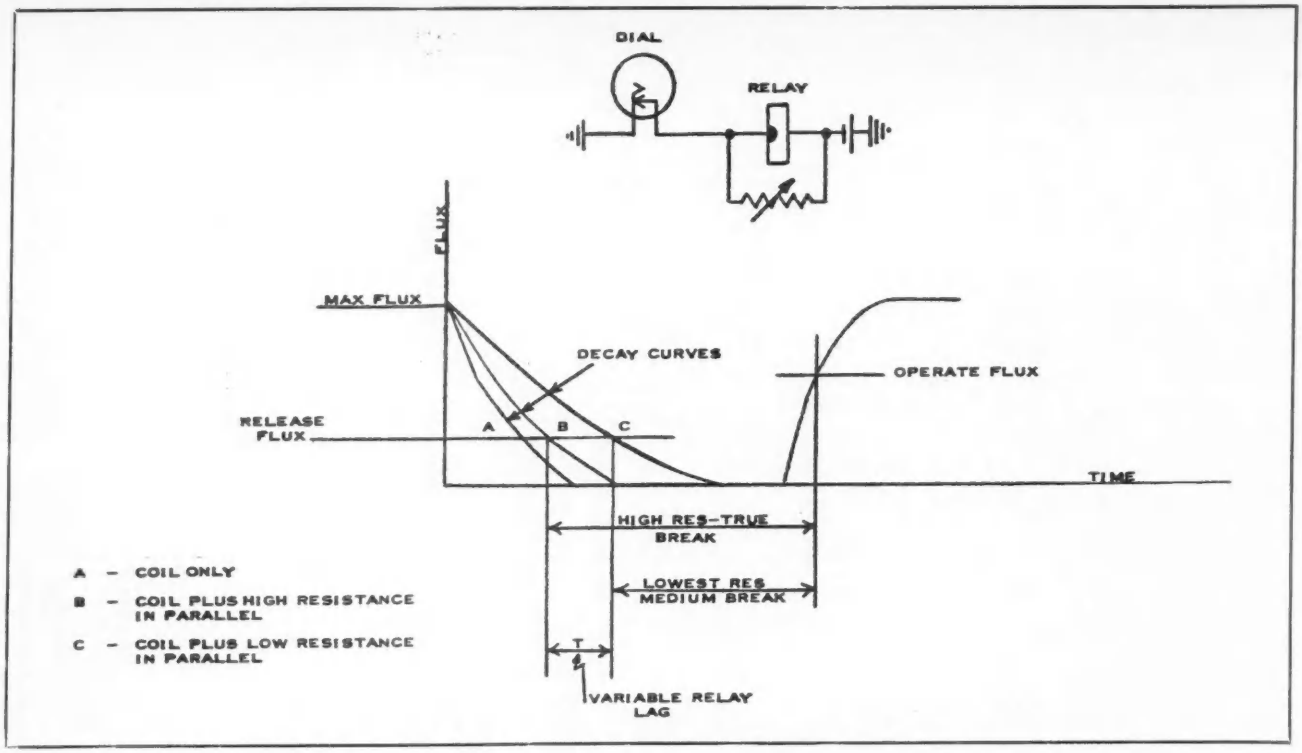

FIGURE SIX: — Graph showing effect on percent break of a relay due to a shunting resistance across relay coil.

from the trunk circuit. The relay RR could be connected to A & B leads to provide the re-ring feature of the trunk circuit.

Note that external A & B leads are not required in the latest inter-toll trunk circuits such as shown in *Figure Three*. The retard coils are built into the trunk circuit; thus the only requirement of the four-wire terminating set or resistance hybrid is that the conventional condenser be provided in series with the two-wire drop. The retard coils also provide substantial improvement in the return loss of the hybrids.

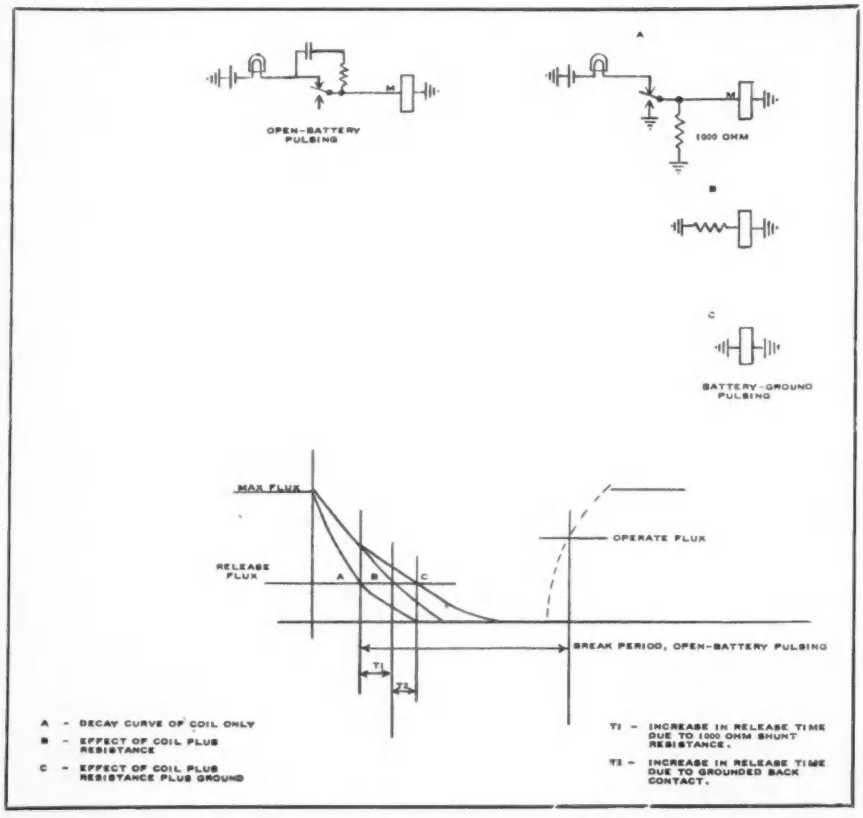

FIGURE SEVEN: — Graph showing effect on percent break of a relay due to open-battery and battery-ground pulsing.

Pulsing Considerations

A DIAL SPEED between 9.5 to 10.5 pulses per second is used with the circuits shown in *Figure Three*. Automatic Electric Co. dials are set for a nominal 38.5% make, or conversely a 61.5% break — indicating the ratio of the time the contacts are open as compared to the normal length of a pulse, i.e. break and make. Various pulse ratios may be experienced between the dial and the inter-toll trunk circuit with the percentage break normally converted to 58% by the E & M automatic trunk circuit and transmitted to the carrier terminal equipment at this ratio.

Referring to *Figure Three*, the strappable resistances associated with the PO relay serve to allow the percent break to be varied. The resistances may be considered to be in parallel with the coil of relay PO. *Figure Six* outlines a simplified relay circuit with the graph illustrating the effect of a low and a high value resistance across the relay coil. A shunting resistance across the coil increases

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Part two of Mr. Reed's article on construction equipment discusses (1) auger for frost digging; (2) aerial ladder for cable splicing work; (3) hydraulic reel trailers; (4) ventilating and heating equipment for manhole work; and (5) mobile power plants for construction work.

NEW LABOR SAVING EQUIPMENT

By JOHN S. REED

Digging Pole Holes In Rocky Ground

THE PROBLEM of digging pole holes in rocky ground has long been a serious one, particularly where the earth is interspersed with granite boulders. Conventional augers will not work satisfactorily in soils of this kind. They will either deflect or balk on coming in contact with stones in the ground.

The PolerBore auger illustrated in *Figures* 11 and 12 was designed primarily for frost digging but will successfully bore holes in difficult soil. The auger has a lower frontal area, which means a greater part of the torque is utilized for digging instead of being dissipated in overcoming auger drag resistance. The helix is aided by special cutting teeth, which are set in two flights and easily and quickly inserted. Strong changeable penetrator points are designed for handling frozen ground or solid rock, or for working into boulder-interspersed soil.

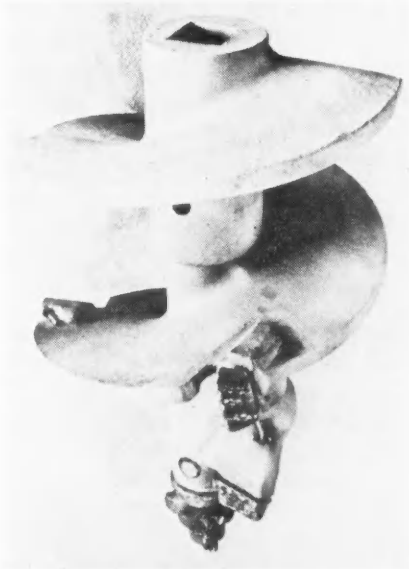

FIGURE 11: — PolerBore auger for digging pole holes in boulder interspersed soil and frozen ground. Note teeth set in two flights of the auger. (Trainer Associates)

FIGURE 12: — Using PolerBore auger in digging pole holes. Note granite lumps in soil on auger flights. The auger is capable of easing out boulders longer than the diameter of the pole.

Distribution of the cutting effort over two flights of strategically placed teeth serves to reduce the sidesway and other eccentric forces usually generated by augers, thus easing the digging task and sparing the expensive digging machine from excessive vibration shock. The helix which spirals upward to the full cutting diameter increases the ability of the cutting edges to work around rocks and concentrates the torque of the machine on the hard material in the path of a cutting edge, rather than attenuating the effort along a blade or row of blades.

To avoid the problem of the bolts that hold the cutting teeth in place in conventional augers wearing or becoming deformed, a simple tooth-mounting technique is employed. Individual teeth are held in place by tail lugs which pass through the tooth sockets. Only a hammer or screw driver is needed to replace a tooth and bend the lug into place. This novel mounting of the cutting teeth, with their soft steel locking lugs, reduces the need to hammer the teeth on the hard edges to ensure seating and provides a safety feature.

The design of the auger teeth and flight is such that the auger will "worm" by big stones and bring them up to the surface to be spun off. With conventional augers, it would have been necessary to enlarge the hole with successive parallel bores and handwork would have been required to remove the boulders.

Augers built primarily for solid rock are not suited for work in rocky soil because the intermittent impact is too much for the teeth. These augers are not designed to work down beside the stones and bring them up to the surface.

The PolerBore auger will even work in soupy ground where ordinarily pumps and hand digging are required, provided that the auger equipment can be brought over the hole location. Its burrowing, shouldering action shoves and twists the

rocks into the sides of the hole. Where the ground is very wet, the auger will not bring much earth out of the hole. Yet the pole can be set in the wet hole without the need to dip, scoop or pump out the water and mud.

Even with the ground frozen hard, the PolerBore auger works the frozen lumps loose and rapidly digs through the frost line.

Aerial Ladders For Cable Splicing Work

THE CONVENIENCE of a mobile aerial ladder for cable splicing operations cannot be denied, particularly when the work is to be done in street and alley locations where the splicer's truck can be parked within reach of the splice point.

Two types of aerial ladders are discussed in this article. These are illustrated in *Figures* 13 and 14. The ladder unit shown in *Figure* 13 is a combination hydraulic elevating and manually rotating type.

The elevating mechanism is actuated by a hydraulic cylinder powered by an electric motor-driven pump. The motor, operated by the truck battery, is designed to work with 6- or 12-volt chassis electric system and use of the motor has no appreciable effect on life of the battery.

FIGURE 13: — Revolving aerial ladder with electric motor driven pump for operating hydraulic cylinder to elevate ladder. Insert shows motor and pump unit on revolving mast. (McCabe-Powers Auto Body Co.)

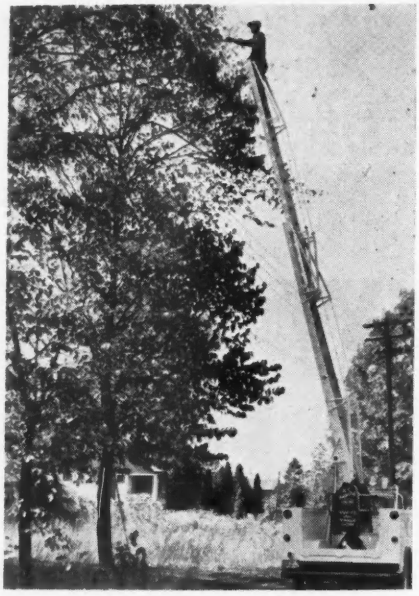

FIGURE 14: — Aerial ladder with hydraulic controls for elevation, rotation, extension and retraction. (Holan Corporation)

Hydraulic elevation of the ladder by means of an electric motor is said to eliminate the cost of installing the power take-off normally required when hydraulic power is utilized on ladder equipment. A control switch can be provided to permit operation of the ladder from the working platform.

The ladder is lowered by gravity. A manually-operated check valve regulates release of oil from the hydraulic cylinder, aiding in positioning of the ladder and controlling the speed of descent. A handwheel, which operates a worm and ring gear mechanism, rotates the ladder 360 degrees in either direction. The ladder is automatically locked in the position to which it is turned.

Extension of the upper ladder is manually controlled by a handwheel and twin roller chain assembly. The upper ladder rides on rubber-covered rollers and is locked in desired position of extension by aluminum-bronze hooks which engage rungs on the lower ladder.

The type of ladder illustrated is available in four sizes. Based on installation on a body having ground-to-body floor height of approximately 30″, the ground-to-working platform heights of the four sizes available are 27 feet, 31 feet, 35 feet and 40 feet.

The all-hydraulic aerial ladder shown in *Figure* 14 will hydraulically control every move, elevation, rotation, extension, and retraction. It rotates a full 360 degrees, elevates to a 75 degree angle, and extends up to a 40 foot platform height.

The hydraulic pump is operated by a power take-off from the truck transmission or by a 5 H.P. gasoline engine on the ladder mast.

Three control levers on the mast control the operation of the ladder mechanism. One lever controls the elevation of the ladder, another lever, the rotation, and another the extension and retraction of the fly ladder.

Another model of the aerial ladder makes use of platform controls in place of the mast-based controls. These are an electrically-controlled hydraulic type which the operator on the platform can use for the extension, retraction, rotation, and elevation of the ladder. These controls are of the dead-man type; that is, everything stops as soon as the workman takes his hand off the controls.

Hydraulic Cable Reel Trailer

A MECHANICAL cable reel trailer is rather difficult to handle when loading or unloading cable reels. This type loads the reel by tipping back the trailer tongue, picking up the reel on a truck bar in the saddles, and then tipping back the tongue to its horizontal position. A winch line is employed to raise and pull back the tongue to the horizontal line. This is not an easy operation when a large and ungainly reel is being loaded.

The hydraulic lift cable carrier illustrated in *Figure* 15 will easily handle reels up to 8 feet in diameter, up to four feet in width, and up to 7 tons in weight.

It lifts the reel directly off the ground in six to eight minutes by means of hand pumps operated by one man. The hand pumps are of the double activation type which also raise or lower the front support.

The cable reel is securely locked in

position before the lifting operation starts and the location of the hand pumps places the operator several feet away from moving parts, adding to the safety of the workman.

The cable reel carrier combines the functions of hydraulic lift, trailer, and reel stand. In the last function, it is possible to directly connect to the truck pintle hook. The carrier also features electric brakes with break-away safety switch to stop the trailer in the event of its disconnection from the truck pintle hook while traveling on the road. A locking bar on the spindle carrier bracket prevents the spindle bar from jumping out.

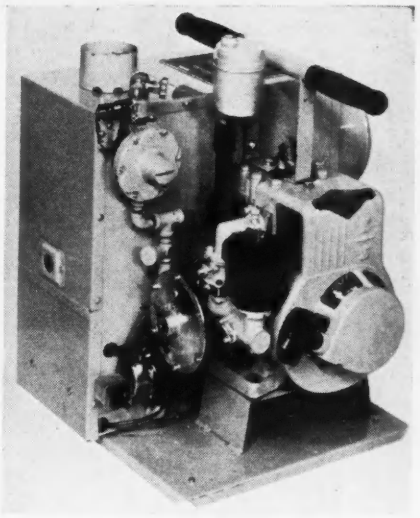

FIGURE 16: — Manhole ventilator with heater, showing engine side. (Morrison-Pelsue Co.)

Ventilating & Heating Equipment For Manhole Work

FOR THE safety and comfort of cable splicers and other telephone company employes working in manholes, blowers with heating provision are a popular means of removing gas and dead air from the manholes and at the same time furnishing a current of warm air which will take the chill and dampness out of the atmosphere inside the manhole.

Propane type manhole ventilators and heaters are coming more and more into use by telephone companies for manhole work. Such models are available as straight blower type without heating unit, blower type equipped with heaters, and combination blower, heater, and direct current generator as shown in *Figures* 16 and 17.

The blower and heater type is shown in *Figure* 16. The blower on the unit is a squirrel cage type with air delivery capacity of 300 to 800 feet per minute. The engine is a Briggs and Stratton 6-B engine converted from gasoline carburation to propane, using propane as fuel. The heating unit is a forced air two-stage inspiration type burner.

Starting at the bottom is shown the safety valve with reset button or the metal guard. Above the safety valve is a propane carburator regulator showing the prime button in the center of the guard on the top plate. Above the carburator is a burner regulator valve which controls the height of the burner flame in the combustion chamber. The low pressure regulator is next above together with the tank connection, and auxiliary outlet. The auxiliary outlet valve is for use with propane lead melting furnace, providing full pressure.

Above the auxiliary outlet is the heat exchanger exhaust chimney which discharges the noxious gases from the combustion chamber so that only fresh air or heated fresh air is discharged from the ventilating or outlet on the front side of the unit.

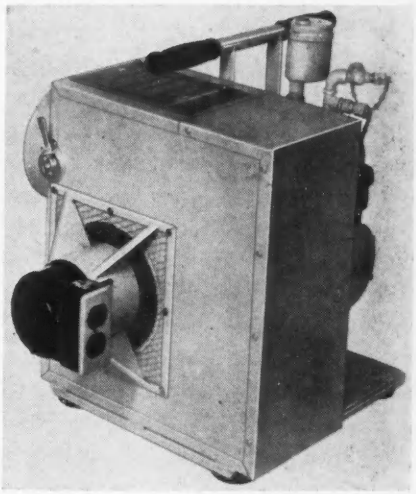

FIGURE 17: — Manhole ventilator with 300-watt D.C. generator. Note outlets on generator unit.

It will be noted from the illustration that the engine has a recoil type starter. The muffler is a low tone type.

In *Figure* 17 is shown a ventilating type heater with 300 watt DC generator with two outlets. An on-off field switch is provided for turning the generator on or off.

In use, the equipment is placed about 10 feet from the manhole opening. A flexible air duct is lead from the blower into the manhole with a lower end about ten inches to twelve inches above the floor of the manhole. This position of the duct end inside the manhole provides a thorough flow of air and removes explosive gases from all air pockets.

The manufacturer provides detailed

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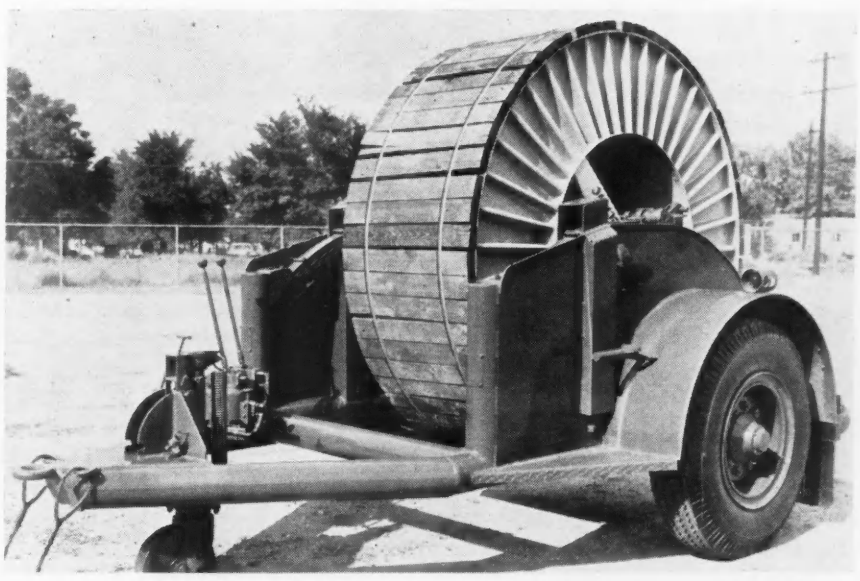

FIGURE 15: — Hydraulic Cable Reel Trailer with 14000-lb. capacity. (Truck Equipment Co.)

Electronic Communications

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Sputtered Thin-Film Resistors

SPUTTERED thin-film resistors, formed from refractory metals such as tantalum and titanium, may be an important development in microminiature electronics. Such resistors can be produced on glass or ceramic bases in lines as narrow as 1 mil (0.001 inch), spaced 1 mil apart, thus producing extremely high resistance in a small area, according to a recent paper by D. A. McLean of Bell Telephone Laboratories.

The new miniature resistors owe their success to a high precision masking process, which makes it possible to produce the thin films in specifically restricted locations.

In producing a resistor, an over-all thin film of copper is first deposited onto the ceramic or glass base to form an expendable copper mask by sputtering. This is a technique in which ionized gas molecules bombard a cathode, dislodging atoms of metal which then redeposit on nearby surfaces.

The desired pattern is etched into the copper surface by standard photoetching techniques, leaving the bare substrate exposed. Tantalum, other refractory metals, or electrically useful alloys are then deposited onto the etched copper pattern, and the whole unit is placed in an etching bath. The copper with its overlay of tantalum is removed, leaving behind only the tantalum which was in direct contact with the bare surface. Since the masks are extremely thin, fine detail is possible. Also, since the sputtered materials adhere to the substrate itself, complicated patterns can be produced.

Sputtered tantalum capacitors with capacitances up to 100,000 micromicrofarads per square centimeter have also been produced.

The extent of size reduction by the use of sputtered resistors and capacitors is demonstrated by the fact that, in one experiment, a three-stage flip-flop circuit on a standard 3½″ x 7″ printed circuit card was reduced to a ceramic substrate only 2″ by 2″. The experiment did not attempt to achieve the maximum reduction possible, but the board still contained 24 resistors in values up to 121,000 ohms, nine capacitors of 10,000 micromicrofarads, and plug-in arrangements for six transistors and nine diodes. In this arrangement, the density of passive components is about 275,000 per cu. ft., including the 50-mil thick substrate. Use of both sides of the board would approximately double this figure.

D. A. McLEAN, Bell Telephone Laboratories, compares the reduced size of a printed circuit using his newly developed sputtered resistors with the comparable conventional printed circuit board in his right hand. The small ceramic circuit card contains sputtered capacitors and connecting leads, as well as the resistors, thus incorporating all the components appearing on the conventional board except the diodes, which can be attached by dip soldering techniques. The apparatus used in sputtering the components appears in the background.

One of the most important aspects of the new de-

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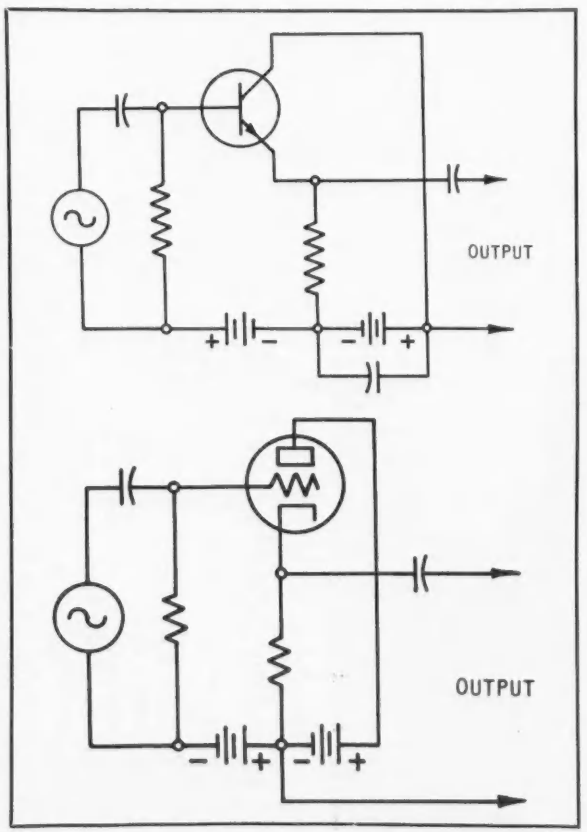
ELECTRONICS NOTEBOOK

By LEO G. SANDS

6.1-4 GROUNDED COLLECTOR AMPLIFIER

A grounded collector amplifier is comparable to a cathode follower. There is no phase reversal. It



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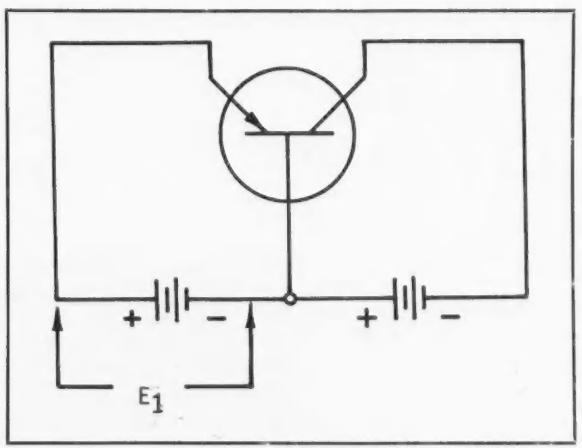
By LEO G. SANDS

has a high impedance input and a low impedance output (less than 100 ohms). Like its vacuum tube counterpart, voltage gain is less than one.

6.2 PNP TRANSISTOR

A PNP transistor is biased opposite to an NPN transistor. With the emitter biased positive with



respect to the base, the positive *holes* (electrons are negative) are repelled. But most of them are attracted to the negatively biased collector. Thus current flows through the collector circuit increasing as E_1 rises.

The input and output are connected in the same manner as with an NPN transistor. When the signal swings far enough in a negative direction to reverse the bias, no current will flow.

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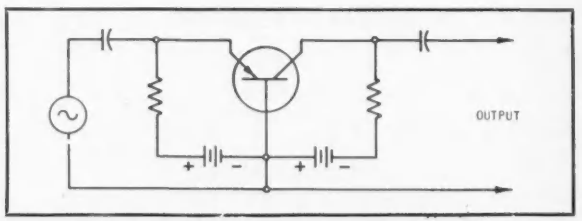
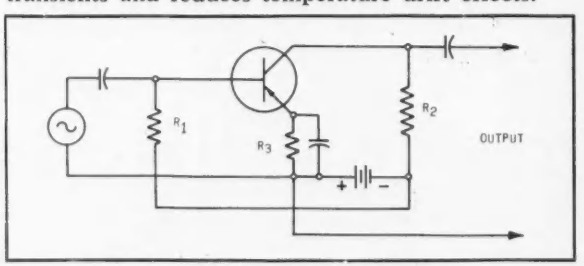


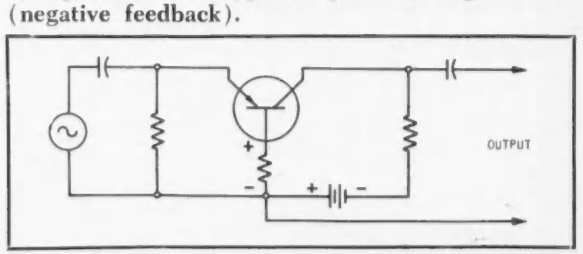
6.2-1 COMMON EMITTER AMPLIFIER

In practice, a stabilizing resistor is commonly used (R_3) which compensates for differences in transients and reduces temperature drift effects.



6.2-2 COMMON BASE AMPLIFIER

In a common base amplifier, stability is provided by R_3, which if unbypassed produces degeneration (negative feedback).



More Data For Your "Electronics Notebook" in the Next Issue.

Electronic Communications

(Continued from page 50)

velopment, according to McLean, is the production of high quality capacitors and resistors from a single metal, cutting down the number of required operations. Also stable interconnections can be made simultaneously with the components.

Ferroelectric Converter Produces High Voltages

NEW DEVICE that can produce high-voltage electricity directly from the warming power of a sunbeam or other heat source has been developed by International Telephone and Telegraph Corporation.

High voltage for satellites can be produced directly from the warming power of a sunbeam or other heat source by a ferroelectric converter. Unlike present "solar batteries," which depend on light to supply direct current at low voltages, the converter relies on temperature changes alone. Typifying the converter's application is this space satellite mockup shown under simulated solar-heat conditions by engineer SIGMUND R. HOH of International Telephone and Telegraph Laboratories. The dark sections of special ceramic coating provide the high-voltage alternating current. Outputs of more than 1,000 volts have been obtained using a single converter element the size of a dime. By arranging elements in series, outputs of approximately 1,000,000 volts are theoretically possible.

Relying on the inexhaustible supply of solar heat, the simple system for converting the sun's rays to electrical energy is expected to have far-reaching effects in space communications and space travel. It is termed a ferroelectric converter.

Unlike solar batteries which supply only direct current at low voltages, the new device supplies both a-c and d-c current at high voltages. Solar batteries depend on light for their usefulness. The ferroelectric converter may use other heat sources, such as nuclear heat, and, therefore, can operate while in shadow.

In sunlight, a spinning satellite always presents some part of its exterior to the warming rays of the sun. The surfaces alternately heat and cool as the vehicle spins through space, providing exactly the conditions needed to produce an electrical current.

The principles behind this type of energy converter hinge on the special characteristics of a family of insulating materials known as ferroelectrics. As these ceramic substances, sandwiched between charged plates, are heated, they transfer their electrical energy to the plates, increasing the voltage. In this fashion heat is converted to electrical energy.

In a typical satellite application a pair of ceramic "sandwiches" would be connected. Through the heating and cooling processes a current is made to flow back and forth from one to the other. A number of additional "capacitors" or ferroelectric sandwiches can be connected to increase the available voltage or current. In addition, the temperature characteristics of the ceramic materials can be manipulated and tailored to meet the specific requirements of any given environment.

The converter can be used to power transmitters, receivers and similar equipment in space vehicles. It is claimed that extremely high voltages can be obtained to provide power for propelling space ships. Using a single converter element the size of a dime, outputs of more than 1,000 volts already have been obtained directly without need for voltage step-up devices. By arranging elements in series, outputs of 1,000,000 volts are theoretically possible. Converters with a better power output per pound than existing satellite power supplies are said to be possible.

Artificial Larynx Uses Transistors And Miniature Components

NEW artificial larynx for persons who have lost their voices through surgical removal (laryngectomy) or paralysis of their vocal cords has been produced. Still in the experimental stage, it is the result of considerable background of research in psychoacoustics.

With a minimum of difficulty and training, laryngectomees can use the new electronic larynx to speak conversationally. It is especially effective when conversing over the telephone. By means of a finger-operated combination push-to-talk switch and inflection

control, the user can easily control the pitch of his artificial voice, thus giving his speech a natural sounding quality previously unobtainable.

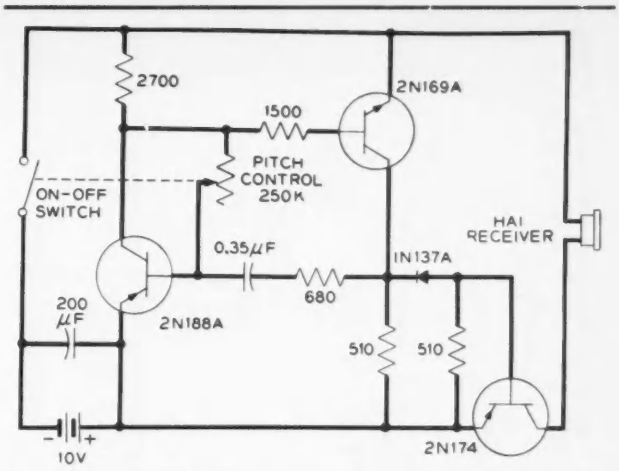
The underlying principle of the new artificial larynx is a vibrating driver (transducer) held against the throat. Completely self-contained and cylindrically shaped, it measures only 1¾ inches in diameter by 3¼ inches long. Included in this one small package is a modified telephone receiver serving as the throat vibrator, a highly efficient transistorized pulse generator with pitch control, and a battery power supply. To miniaturize the new artificial larynx, experimental units were built using modular techniques. However, by employing printed-circuit techniques it is anticipated that an even more compact unit can be built.

To use the device, the laryngectomized person presses the vibrator against his throat. Switching on the pulse generator with his finger, he transforms vibrations transmitted into his throat cavities into speech sounds by normal use of the articulatory mechanisms, that is, throat cavity or pharynx, tongue, mouth, teeth, and lips in his vocal tract.

Output speech volume obtained with the artificial larynx is equal to that of a person speaking at a normal conversational level, though the sound is a bit buzzy and mechanical. Users of the new artificial larynx can achieve a sentence intelligibility of 97 per cent or more, depending on their experience.

The artificial larynx requires an economical, self-contained power source to produce maximum acoustic output with a minimum of current drain. As shown in the accompanying sketch, two transistors are used in a relaxation oscillator with its frequency controlled by a variable resistance, and its pulse width determined by a feedback network. The output is a negative pulse with a frequency of about 100 to 200 cycles per second. This repetition frequency may be varied from about 100 to 200 cycles by a rheostat which the user operates by pressure on the push-to-talk switch — or inflection control — while speaking, thus changing the pitch of his voice. For use by women talkers, the frequency range is adjusted to 200 to 400 cycles, corresponding to the normal range of pitch of a woman's voice.

While F. E. HAWORTH (right) speaks by means of artificial larynx, H. L. BARNEY takes reading on a sound-level meter. Output speech volume is equivalent to that of normal talker. Both men played important roles in the development of the electronic larynx.



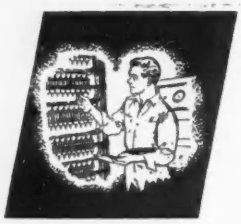
Sketch of artificial larynx circuit. The pulse generator with pitch control employs three transistors. The circuit parameters are adjusted to yield maximum acoustic output with a minimum of current drain. A single-ended power output stage, using the 2N174 transistor, amplifies the pulses applied to it through the 1N137A diode.

A third transistor is used in a single-ended power output stage to amplify the pulses applied to it from the relaxation oscillator. A diode isolates the multivibrator from the power amplifier input impedance during the period between pulses for stable operation.

Two 5.2-volt mercury cells in series provide the current for operating the artificial larynx continuously for a period of approximately 12 hours. These batteries have a 250-milliampere hour rating at a current drain of 25 milliamperes. With push-to-talk operation such as the laryngectomized patient requires, 12 hours of continuous operation should be equivalent to several days or even weeks of normal talking.

A small a-c power supply which can be fed from a normal wall outlet at home or in the office may be employed. When the artificial larynx is plugged into the power supply, its batteries are disconnected from the circuit.

Thanks to the many readers who have written us regarding TE&M's new feature — "Electronic Communications." We appreciate your kind comments. And for those readers who have asked for a Home Study Course in "Electronics," we will start the course in an early issue as a regular part of the "Electronic Communications" section.



"SUB-HARMONICS and OVERTONES"

By C. D. EHINGER

Instruments For The Equipment Room

Many adjuncts to test instruments are available. Here is a report on several, plus information on a lightweight, small, and inexpensive tube checker.

IN ADDITION to test instruments for various purposes, many of the kit manufacturers and suppliers are now marketing several adjuncts for use in conjunction with test instruments. *J. W. Rubin*, advertising manager of *Allied Radio Corp.*, was kind enough to send four such kits to the *TE&M Lab* for assembly, checking, and evaluation as to use in the usual telephone equipment room.

Resistance and Capacitance Substitution

THE FIRST two units are a resistance substitution box and a capacitance substitution box. The assembled units can be seen in *Figure A* with the resistance substitution box on the left. Size of each unit is 3¾ x 6¼ x 2 inches, and each unit has 18 inch test leads terminated in alligator test clips. Assembly time for each unit is approximately 1½ to 3 hours. The resistance substitution box consists of 36, 1 watt, 10 percent tolerance resistors. By means of two switches on the face of the unit, any resistor can be selected for use. Value of the resistances varies from 15 ohms to 10 megohms.

Resistance substitution boxes are an invaluable aid in breadboard assembly of new circuits. Different values of resistance can be quickly and easily selected for checking circuit behavior under various conditions. In the telephone equipment room, resistance substitution boxes will find much use in connection with substituting and checking for various values in carrier circuits, audio amplifiers, etc. Wiring capacitance, associated with the units, makes them unsuitable for any work in the r.f. range of frequencies but this capacitance will be negligible for most audio and carrier-frequency work.

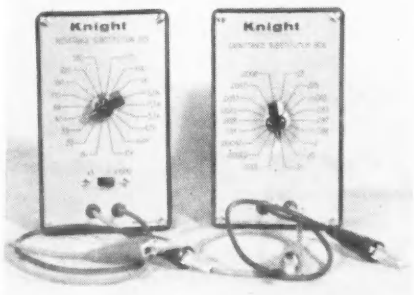


Fig. A: — The Knight Kit Resistance and Capacitance Substitution Boxes. Components of standard size and tolerance are used to facilitate procural of components indicated by "substitution."

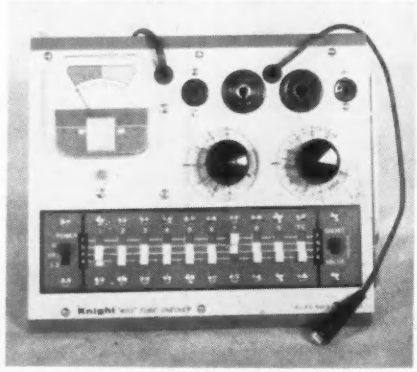


Fig. B: — The Knight Kit "400" tube checker. Only 10 x 8 x 2½ inches in size, weighing 5¼ lbs. and selling for less than $20.00, the kit has a variety of applications.

The capacitance substitution box, shown on the right in *Figure A*, consists of 18 capacitors of a tolerance range of ±20% and in values ranging from 100 mmf. to .22mf. As in the case of the resistance substitution box, the various values are standard and identical to those easily obtained from any radio supply house. Assembly time for the unit is approximately 1½ — 3 hours.

Various uses for the capacitance substitution box are almost identical to its companion unit, the resistance substitution box. Tubular and ceramic capacitors frequently become unreadable, as they become older, and replacement of a faulty capacitor of unknown value can be easily made by substituting different values until proper circuit operation is obtained.

An Inexpensive Tube Checker

FIGURE B shows the Knight Kit "400" tube checker. This is a small, lightweight, inexpensive unit suitable for checking all of the popular receiving tubes. Dimensions are 10 x 8 x 2½ inches and weight is 5¼ pounds. The kit sells for less than $20.00 and assembly time is between 3 and 5 hours.

Checks can be made for shorted tube elements and filament continuity, and a meter indicates suitability of tubes by the evaluation of cathode emission. A small drawer, contained in the unit, holds a group of cards which list four hundred different tube types most commonly used in audio, radio, and TV units. Four sockets are provided for 7-pin miniature, 9-pin miniature, octal, and loctal-base tubes.

Because of its extremely light weight, size, and low cost, this unit will undoubtedly find considerable

use in any telephone equipment room for checking units using vacuum tubes. It is designed for rugged service and appears to be suited for the usual knocks and bangs which most test instruments receive when transported in telephone service trucks.

Voltage Calibrator For Oscilloscope

FIGURE C is a view of a voltage calibrator designed for use with any oscilloscope which does not have precise calibration of the vertical input amplifier. Several articles have appeared recently in TE&M concerning the value of oscilloscopes in the telephone equipment room. (Due to the heavy volume of mail concerning these articles, a series on the actual uses of the oscilloscope will appear in future articles of TE&M.)

The voltage calibrator is a very useful adjunct and this particular unit can be assembled in approximately 3 hours. Dimensions are 7½ x 5½ x 4¼ inches.

Output terminals of the units can be permanently connected to the vertical input terminals of an oscilloscope. Test prods can then be permanently connected to the input terminals of the voltage calibrator. A six position range selector switch on the unit selects the various modes of operation of the unit. In the "calibrate" position, the calibrator's input terminals are connected directly to its output terminals and the oscilloscope performs normally.

When a wave form, of unknown voltage peak values, is displayed on the oscilloscope screen, the vertical gain of the scope can be adjusted to display the wave form between definite points on the face of the scope, usually preselected horizontal graph lines displayed on most oscilloscope screens.

If the scope operator desires to measure the peak to peak values of the displayed wave form, the voltage calibrator range selector switch is then moved to the .01 volt, .1 volt, 1.0 volt, or 10.0 volt range — whichever is suitable. Two horizontal lines then appear on the oscilloscope screen.

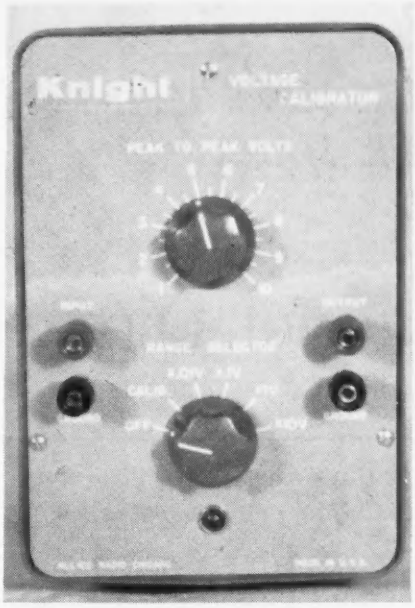


Fig. C: — Voltage calibrator for use with an oscilloscope. The unit is designed for use with scopes which do not have voltage-calibrated vertical inputs and provides a quick and accurate means of determining the peak-to-peak voltage of any waveform.

A second control on the voltage calibrator designated as "peak to peak volts" is then varied until the two horizontal lines correspond to the heights of the unknown wave form to be measured.

The "peak to peak volt" control is calibrated in a range from 1 through 10 which is used as a multiplier of the range voltage selected. Maximum "peak to peak voltage" of the unit is 100 volts; however, this does not mean a 100 volt limitation to the measurement of voltages on the oscilloscope. As an example, 42 cycle ringing voltage can be displayed on a scope. Such voltages are usually much higher than 100 volts peak to peak. The voltage calibrator, in such cases, can be first displayed on the screen with the range selector in the 10 volt position and the peak to peak voltage selector in the 10 position.

The horizontal lines on the oscilloscope screen can then be varied, by means of the vertical gain attenuator, until they occupy exactly one vertical unit on the screen (centimeters or inches, depending upon scope calibration). The unknown voltage can then be displayed on the screen and the number of vertical spaces occupied can be counted and the peak to peak voltage accurately measured. In the case of the 42 cycle ringing voltage previously mentioned, a value of 360 volts, peak to peak, would be indicated if the display occupied 3.6 vertical spaces.

Since the information obtained is "peak to peak" values of voltage, r.m.s. values of a sine wave voltage can easily be obtained by dividing the peak to peak value by 2.828.

The unit supplied to the TE&M lab was easily assembled and was checked. No difficulty was encountered in calibrating the instrument and the unit should be easily capable of six percent accuracy of dial settings on any range. — *C. D. Ehinger.*

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Any comments, criticisms, or suggestions for future topics? Address all correspondence to "Sub-Harmonics and Overtones," Telephone Engineer & Management, 7720 Sheridan Road, Chicago 26, Illinois.

Manufacturer's Comments:

WE WOULD like to emphasize the point that the "400" tube-checker, its low price notwithstanding, is a genuine emission-checker, in addition to its secondary functions of checking for filament shorts and continuity. To contribute to accuracy it even includes a "Hi-Lo" switch to compensate for high or low line voltages.

The Knight-Kit voltage calibrator might well be described as a device which converts any oscilloscope into a vacuum tube voltmeter. Actually any scope has all the necessary attributes of a VTVM, with one exception — it usually has no method of measuring the voltage value of the signal being observed. The calibrator fills this need by superimposing a peak-to-peak square wave of known voltage on the screen — this provides the necessary reference points for measuring the voltage of any signal being viewed. Thus, with the addition of an inexpensive device such as this, any oscilloscope becomes a dual-purpose instrument. — *Allied Radio Corp.*

COMMERCIAL DEPARTMENT NOTES
By ALLAN R. STACEY

The Regional Directory Plan

Based on the author's experience the regional directory plan has advantages and disadvantages for the public and the operating telephone companies. Here's how the plan works, and some "pro's" and "con's" that must be considered.

IN THE center of my desk lay our new 1960 telephone directory. I observed with interest that it was a little thinner than last year because we had just completed conversion from three columns on the page to four columns using smaller type. The 1960 directory contained 714 alphabetical white pages compared with more than 1,000 in the directory of the previous year.

This book represented one type of "regional" directory because our company operated only one-half of one per cent of the stations listed in the 714 white pages. The yellow pages contained advertising from subscribers of our own exchange plus foreign advertisers in almost equal number. For more than ten years now we have been operating a "regional" directory.

What Is A Regional Directory?

THERE are at least three types of regional directories. In one type there is a directory made up of all of the outlying exchanges surrounding a major trading center with a second directory issued for the trading center alone. There is no community of interest between the exchanges listed in the directory surrounding the major market other than all of them having a greater or lesser affinity towards the major market itself. With this type of directory, foreign advertising was sold out of the major market into the surrounding area directory.

A second type of regional directory is one of the kind my own company has been using. In this instance, alphabetical listings are interlocked for up to half a million subscribers but the yellow page advertisers are grouped by community, or possibly by corporate boundaries of the telephone company involved in the service. In our case, each company is responsible for selling and compiling the yellow page advertising appearing in its own book. Further, each company is responsible for development of its own cover and fill-in pages.

A third type of regional directory has begun to develop within recent years. This is a type with yellow pages completely covering both the outlying exchanges and the major market itself in one book. Listings in the classified section are interlocked regardless of the towns in which they fall. (However, the name of the town does become a part of the address in each listing.) There usually are two or three advertising rates within one regional directory.

How Does It Work?

DISCUSSING now the type with fully interlocked classified advertising, you will readily recognize that some problems develop when several telephone companies are involved in one regional directory. Under one type of contract in use today, the telephone company operating the major trading center takes the initiative and works out with the company or companies operating the outlying exchanges an over-all regional directory. This arrangement can permit the outlying exchange to sell advertising in its own exchange on a do-it-yourself basis or the major trading center company agrees to sell in the outlying exchange at a 25% sales commission. The major trading center company does not charge the outlying exchange company for compilation costs and sells the telephone directories to the latter on an end-of-the-run cost basis.

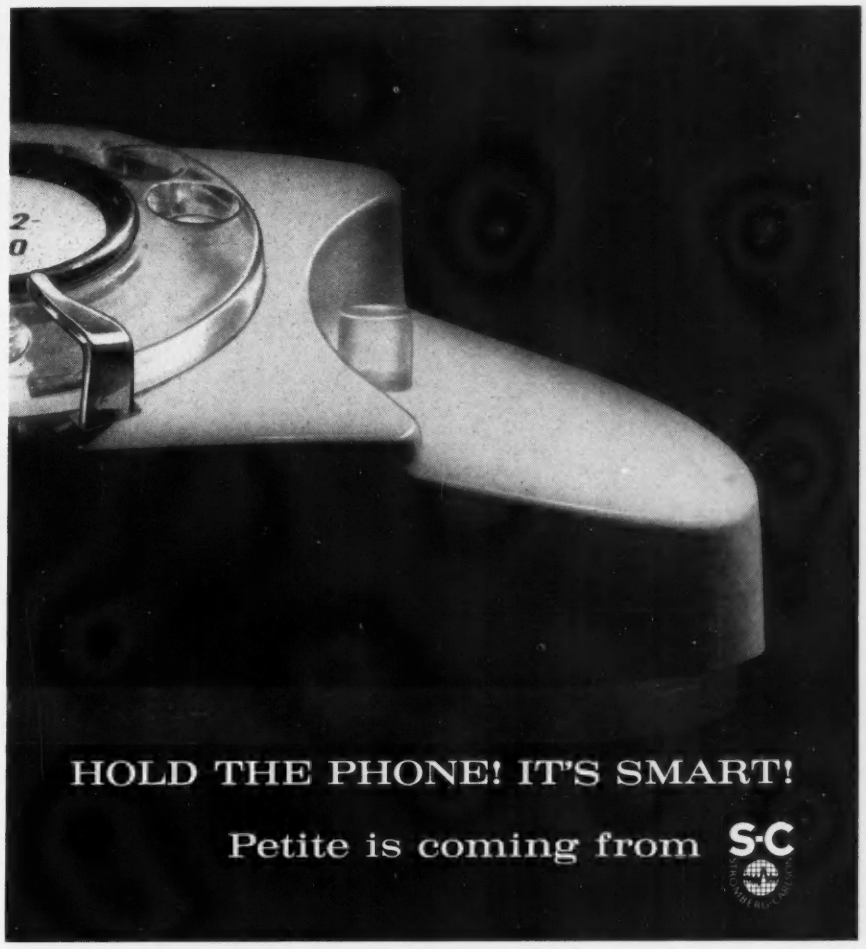
You may wonder how the major exchange benefits. The benefit to the major exchange comes because advertising rates in that major trading center will be increased by adding a proportionate weight of circulation lying in the outlying exchanges. This permits selling more advertising at a higher rate by virtue of including the outlying circulation. In addition, the increased circulation will justify higher rates on national trademark advertising and foreign advertising. The revenue from these higher rates is retained by the telephone company in the major center. Likewise this company's own advertising will be sold at a higher rate by reason of the outlying circulation from which the business firms in the major centers expect to draw business.

First off, the businessman in the main trading center probably prefers to be called upon by only one directory salesman for both foreign

and local advertising. On the debit side, he must face greater competition from other businesses providing the same service he does in the regional area.

The residential subscriber likes having more information available at his fingertips in the white pages and in the yellow pages. However, when the white pages begin to number several hundred and he must search through three pages of Smiths to find the friend in his own community, he sometimes becomes agitated. In my own company's experience, you may reach a stage of growth where interlocked white listings are a mixed blessing to the subscriber and he begins to complain about them as often as he appreciates them. In those regional directories having the alphabetical listings by separate exchanges, the subscribers now have to look for their own exchange section. No longer is it in the front of the directory.

Thirdly, the subscriber has a problem with interlocked yellow page listings when he is not familiar with the directory and the region because he may locate a product or a service which he wants and then find that the business offering it is located twenty or thirty miles away. This is fine as long as he realizes it is a toll call to reach that business, but sometimes he does not.



What Happens To The Directory Publishers?

TELEPHONE operating companies have a responsibility to the service companies who, so ably, supply sales and compilation of telephone directories. The regional directory can have quite an impact upon our directory publishers. A publisher now preparing directories for the outlying exchange may find himself without a directory to publish once it is merged into the regional concept. Or, if the outlying exchange does not go "regional" but other nearby outlying exchanges do, the publishing company may find that it is no longer possible to produce a sufficiently broad base of advertising, foreign and local, to make the single directory economically feasible.

On the other hand, our directory publishers can profit if they are now publishing the major trading center directory and it is expanded into a regional directory.

What Happens To Company Operating Outlying Exchange?

FIRST, the regional directory will probably stimulate toll, especially if it is direct distance dialing for the subscriber.

Second, the directory revenues will probably increase. Preliminary indications are that, in some areas, sharp increases can be accomplished. On the other hand, there have been one or two instances where an outlying exchange operating company pulled out of the regional directory plan. Presumably, this indicates that it did not pay or it did not pay enough to justify certain other inconveniences.

Now let's look at some of the inconveniences or objectionable points for the operator of the outlying exchange to consider when evaluating the regional directory.

The outlying exchange must use the same publishing date as the major exchange because the regional directory is all produced at one time. This presents a problem to the outlying exchange if there is a desire to have an interim directory or a special issue to meet conversions.

The outlying exchange telephone company will lose some of its identity since a regional directory will seldom disclose names of telephone companies involved in the directory. Probably the practice tends, in the minds of the public, to identify the regional directory with the company operating the major center.

The outlying exchange loses control over the foreign advertising appearing in the yellow pages of the regional directory. They are no longer able to refuse foreign advertisers or to limit the type of advertising to that which is non-competitive with products and services provided within the outlying exchange. This can be a public relations problem. The outlying exchange loses the revenue from the foreign listings since that is retained by the major center company.

Once having entered a regional di-

Extra service is a Graybar trademark, too

Like you, Graybar often is called upon for a little extra service. We wouldn't have it otherwise. For Graybar grew up with the telephone industry.

Perhaps your extra need is a technical one. Graybar is ready with competent assistance—inside, outside.

You may face a problem in the rising cost of maintenance. Consult Graybar for the quality equipment that helps provide the answer.

Or you may simply want quicker delivery. In any event, at any time, you can count on Graybar for an extra measure of service. 911

Graybar is your number one source for service... technical assistance...quality equipment...prompt delivery.

GraybaR

ELECTRIC COMPANY, INC.

INDEPENDENT TELEPHONE ASSOCIATION

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Graybar Everything Electrical Graybar Electric Company

This little PARSONS® 77 Trenchliner®

sets fast pace for cable-laying crew...

Only 4 ft. wide — and 5 ft. 8 in. "low", Parsons little 77 Trenchliner is just right for installation of underground telephone cables and conduits. Small in size but big in capacity, it has a work range that will surprise you. For instance . . .

Trench widths: 6 to 18 inches

It opens trench from 6 to 18 in. wide — at depths to 5 ft. Digging speeds range from 4.4 in. to 21 lineal ft. per minute. This lets the 77 "inch" its way past cross-pipes, through rock and other underground obstructions — and lets it "open up" for maximum feet of trench per minute on clear right-of way.

The tiny 77 is heavy-duty in every respect. Has sloping, telescopic ladder boom that undercuts cross-pipes, walks, curbs — makes vertical set-ins. Down-crowd action starts cut fast, hold accurate grade. Self-cleaning, cast-steel buckets are equipped with removable, self-sharpening, point-type teeth. Reversible, power-shift spoil conveyor dodges side obstructions without swerving from grade-line — places spoil bank on either side of trench.

Compact and maneuverable, the 77 Trenchliner works easily in congested areas. It turns within its own length — each crawler is independently driven, independently braked. This little trencher only weighs about 6800 lbs. — handy for quick, easy trailer transport from job to job.

How about a demonstration?

Learn how the 77 Trenchliner can save time and money on your work. Ask Parsons distributor for a demonstration, or write us for catalog.

Want more facts?

mail to: PARSONS Company, Newton, Iowa *for literature on the 77 Trenchliner*

NAME_____ TITLE_____

COMPANY_____ DIV._____

STREET_____

CITY_____ STATE_____

P910 TE

PARSONS TRENCHLINERS
A DIVISION OF KOEHRING COMPANY

rectory, it is sometimes difficult to withdraw if that may be the desire because public pressure will force continuance regardless of the wishes of local management or local business people.

The outlying exchange company can lose its rights to any portion of the national trademark advertising, since the major center company usually retains all trademark revenue in the regional directories.

Since the white pages show the outlying exchanges arranged in alphabetical order by the name of the exchange, there may be no way for the outlying exchange company to place its information pages and alphabetical section in any particular section of the directory.

The outlying exchange company will lose some of the control over directory advertising rates which will be charged in its own exchange because the major center company sets the rates and there may be as many as three different rate bands in a single regional directory. Usually these rates will be higher than those previously predominating in the outlying exchange.

The company operating the outlying exchange may lose its right to hold a directory publishing company responsible for errors and omissions in the directory. Certain regional directory contracts now stipulate that the outlying exchange must bear the responsibility for all errors even though it may not have created those errors.

What does it all add up to? We have a situation with advantages and disadvantages for both the public and the operating telephone companies. Before entering into a regional directory plan, I would sit down and list the advantages and the disadvantages for everybody involved and then make my decision. What do you think? — *Allan R. Stacey.*

You are invited . . . to tell TE&M authors your problems of department policy or procedure on which you'd like to have an opinion.

HIGHEST "TOTAL ECONOMY" FOR TELEPHONE FLEETS PROVEN IN THE LARK

"TOTAL ECONOMY" IS WHAT FLEET OPERATORS LOOK FOR, NOT JUST SPECIAL RECORD RUNS FOR GASOLINE MILEAGE. LARK OFFERS YOU DOLLARS-AND-FACTS PROOF, FROM FLEET RECORDS!

1. LOWER NET COST PROVEN by original price and official trade-in value. Depreciation on Lark fleet model 17%—best of its class. (New compacts have no resale value established yet.)

2. LOWER OPERATING COST PROVEN by actual records of fleet operators all over the country. "Save $40 a month on each Lark" (equipment sales company, California)—"Savings on each taxicab would buy a new cab in 2½ years" (taxi fleet, Massachusetts).

3. LOWER MAINTENANCE COST PROVEN by fleet records. "Saving 33%" (taxi fleet, New York)—"Over 25,000 miles on each Lark in severe Police service—with minimum maintenance" (police department, Indiana).

4. LOWER REPAIR COST PROVEN by fleet records "2.1 mils per mile, against 3.2 mils per mile" (car rental, Colorado)—"No repairs, no new parts, after 10,000 miles on each Lark" (telephone company in Oregon).

5. LOWER INSURANCE COST PROVEN by fleet operators' records (most insurance companies offer 10% or 15% premium discount on Lark-size cars, higher savings possible if you self-insure.) "Have lowest available rate" (taxi fleet, Minnesota)—"Lark costs 20% less in our self-insurance plan" (bakery fleet, Arkansas).

6. PLUS-BETTER DRIVER ACCEPTANCE PROVEN by fleet owners reports. "In all cases our customers have been very pleased with the performance and appearance of The Larks, and we are getting repeat requests for them, the surest sign of satisfaction" (car rental, Ontario)—"All drivers prefer Studebakers to all other units" (taxi fleet, Wyoming).

We invite you to make us prove these advantages—from records of companies in your own field of business.

SEND THIS COUPON!

BUDGET-WISE BUYERS LOVE THAT

LARK
BY STUDEBAKER

TELL US MORE ABOUT LARK SAVINGS!

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☐ Send us informative literature only
☐ Have a factory representative call me for an appointment

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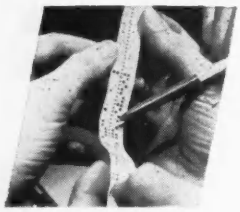
PLEASE PRINT
TITLE _____
COMPANY _____
ADDRESS _____

TE&M 5-15-60



"TRAFFIC LIGHTS" by D. A. PERIGO

Essentials of a Good Service Index

A reader asks — "What is considered essential to have a good index to service?" With that question as a starter, Mr. Perigo changes the question to "What is considered essential for good service?" and proves that accuracy and speed of answer count most with the subscriber.

LILLIAN Kurzfeld of Fort Wayne, Indiana, has asked us some questions about the Service Index. Among the questions is this one — "What is considered essential to have a good index of service?" This is a tantalizing question because of some of the implications. Suppose we ask the question this way — "What is considered essential to good service?" — and forget about an index being involved.

But let's start in the beginning. Surely you have opened a box of candy and found a little square slip of paper that said "Inspected by 6K." Or perhaps you opened a box of kitchenware and found an inspection slip. You might even find an inspection stamp on your Sunday roast. All kinds of manufacturing companies employ inspection as a means of protecting the quality of their products.

Practically any manufactured item follows the specification which is known to produce a quality product. The duty of the Inspector is to determine whether the product turned out the way it was intended. A small defect which is undetected may mean the difference between the success or failure of a product — and that in turn can determine whether a company shows a profit or goes broke. This shows how important inspection can be.

We recently had some motor trouble with a new car. The Service Manager of the garage listened to the motor and looked at its serial number. He then apologized on behalf of the company and told me I had one of the first cars off the assembly line. Someone had made a mistake in the mold for the motor block so it was solid where it should have been open for the circulation of the water. *Inspection had missed it.* When the discovery was made the company sent word to every dealer that all such cars were to be corrected at factory expense. It took over a half day of my time waiting, and several miles thereafter to rebuild my confidence in the car.

This example illustrates that inspectors, being human, can make mistakes even as the molder had. Very easily this can lead to a question — "If inspection misses these things why spend all the money to have an Inspection Department?" We have no patience with this kind of reasoning. It is just as illogical as it is to suggest doing away with physicians because a doctor killed a patient — or to do away with the church because a clergyman was discovered to be immoral.

"Our Product Is Service"

NOW, in the telephone business and more particularly the Traffic Department, our product is service. We "manufacture" that service according to specifications. Service observing inspects our product and reports how close we come to the specifications. The result is the Service Index.

Manufacturing specifications permit certain "tolerances." As an example, a hole in a casting through which a bolt will be inserted would be allowed a greater tolerance than the cog of a gear wheel which must mesh silently with another gear wheel.

With the Service Index you may have a perfect 100 without giving perfect service due to the "tolerances." Here is a list of the *tolerances* and the full point credit for each.

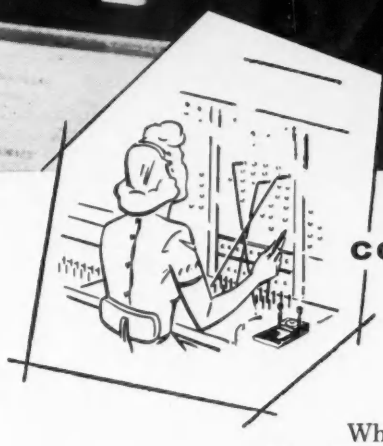
	%	Points
Errors	1.0	20.0
Over & Under Timings	5.0	7.5
Answers to Recording Trunk Signals	5.0	20.0
Attention to Outward Cord Signals	3.0	5.0
Operating Irregularities	5.0	10.0
Ticket Irregularities	3.0	5.0
Answers to Incoming Signals	2.5	10.0
Attention to Incoming Cord Signals	3.0	5.0
Inward Errors	.7	10.0
Inward Irregularities	2.0	7.5
	30.2	100.0

We have added the percentages allowed for each item to demonstrate a point, because when applied to 100 calls observed it means that by having only one of these service failures or inconsistencies on each call, 30 of 100 calls can be affected while you still have a perfect index of 100. Let's look at it from the other angle. If you handled all calls perfectly there would be no bonus points — you would still get an index of 100.

Now let's turn our spotlight on something known as objectives. From the usual source we find that objective, when used as a noun, is defined as "an aim or end of action; point to be reached." Therefore, the objective

CALCULAGRAPH'S NEW 60-minute dial . . .

SIMPLIFIES TOLL CALL RECORDS



CONVERT YOUR SWITCHBOARD NOW!

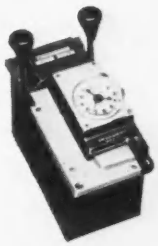
Busy telephone operators are finding the new Calculagraph 60-minute dial *easier to use* and they can now handle more calls more efficiently.

Why? Because they don't have to remember to stop and add 30-minutes to long conversations. This new 60-minute Calculagraph dial does it for them.

This new Calculagraph 60-minute dial assures you, too, of *all charges* due on every call. If you now have 30-minute dials, you can convert your Calculagraphs to the 60-minute dial.

Whether your needs can be met with either the 30-minute or 60-minute dial you can be assured of *100% accuracy* on *all toll calls* with Calculagraphs on *your* switchboard.

Write today for complete information.



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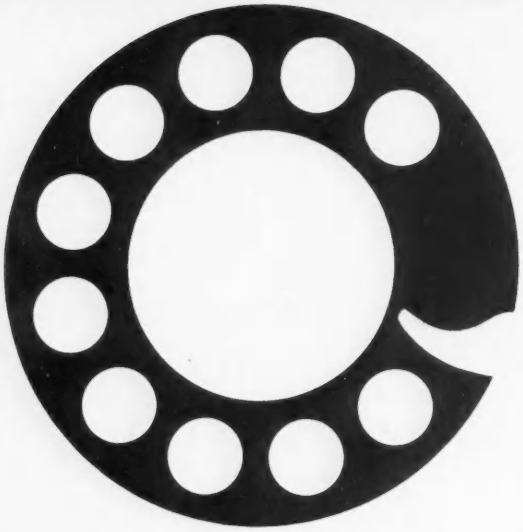
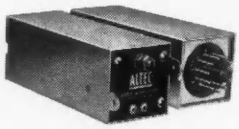
MANUFACTURERS OF ELAPSED TIME RECORDERS FOR OVER 65 YEARS

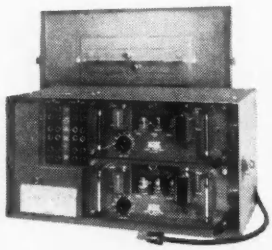
GET ON THE ALTEC LINE—for improved telephone equipment



The best number in your book—the one that connects you with the Altec line. For performance, reliability, and servicing ease, the Altec line of amplifiers and equipment have won a resounding vote of confidence from the industry. Precision-engineered to meet your most exacting specifications, Altec products offer the improved design that makes maximum use of minimum space—and the "plus" that makes the difference—Altec quality.



The 455A Amplifier is a transistorized repeater type amplifier wrapping up a compact package of gain for telephone circuit use. Incorporates the gain, power handling capacity, frequency response, plug-in features in the physical size of vacuum tube type repeater. Ten repeaters go in the same standard rack mount used for vacuum tube types. Operates on 48 volt DC @ 22 ma. Since it is transistorized no 130 volt supply is needed. For details, write for Altec Lansing Bulletin #13385.



The S-17 Amplifier System is designed for the highest quality program transmission over telephone circuits. A single portable and rack-mountable housing contains two (2) amplifiers and accessory jacks and equalizers so that two (2) complete circuits can be maintained without cross talk. Write for Bulletin #12835.

For complete information about Altec telephone and paging equipment write to the address below or call PRospect 4-2900 in Anaheim or ALgonquin 5-3636 in New York.

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must be properly set to measure the results. If an objective is set low enough it can be reached — or the 100 points can be attained. On the other hand, the objective may be set at perfection and 50 points would represent a better job than 100 points with a low objective.

There are ten different items in the list. You will note the lowest "tolerances" are those associated with Errors. This places emphasis on the accuracy of the service. On the other hand, greater "tolerances" are permitted the matter of Answers to signals of various kinds. These items are associated with speed, or quantity. It has always seemed to us that in the quality items, namely errors, the objective should be perfection while the objective on the quantity or speed items should allow for even greater tolerances.

It is often stated that a telephone company's policy should be to give the "best possible service" at all times. To the best of our knowledge this has never been the policy of any company. If it were, the above items of the Service Index would necessarily be stated with no tolerances whatever.

To give the "best possible service" would mean *immediate* answers on *every* call offered. To give service such as this would require a tremendous increase in the force so that an operator was always available to answer the signal that *might* appear. This is an economic impossibility. One should not take just one part of the policy statement but use it in its entirety — ". . . . the best possible service at the least cost consistent with fair treatment of the employes and a return to the stockholder that will assure the financial safety of the enterprise."

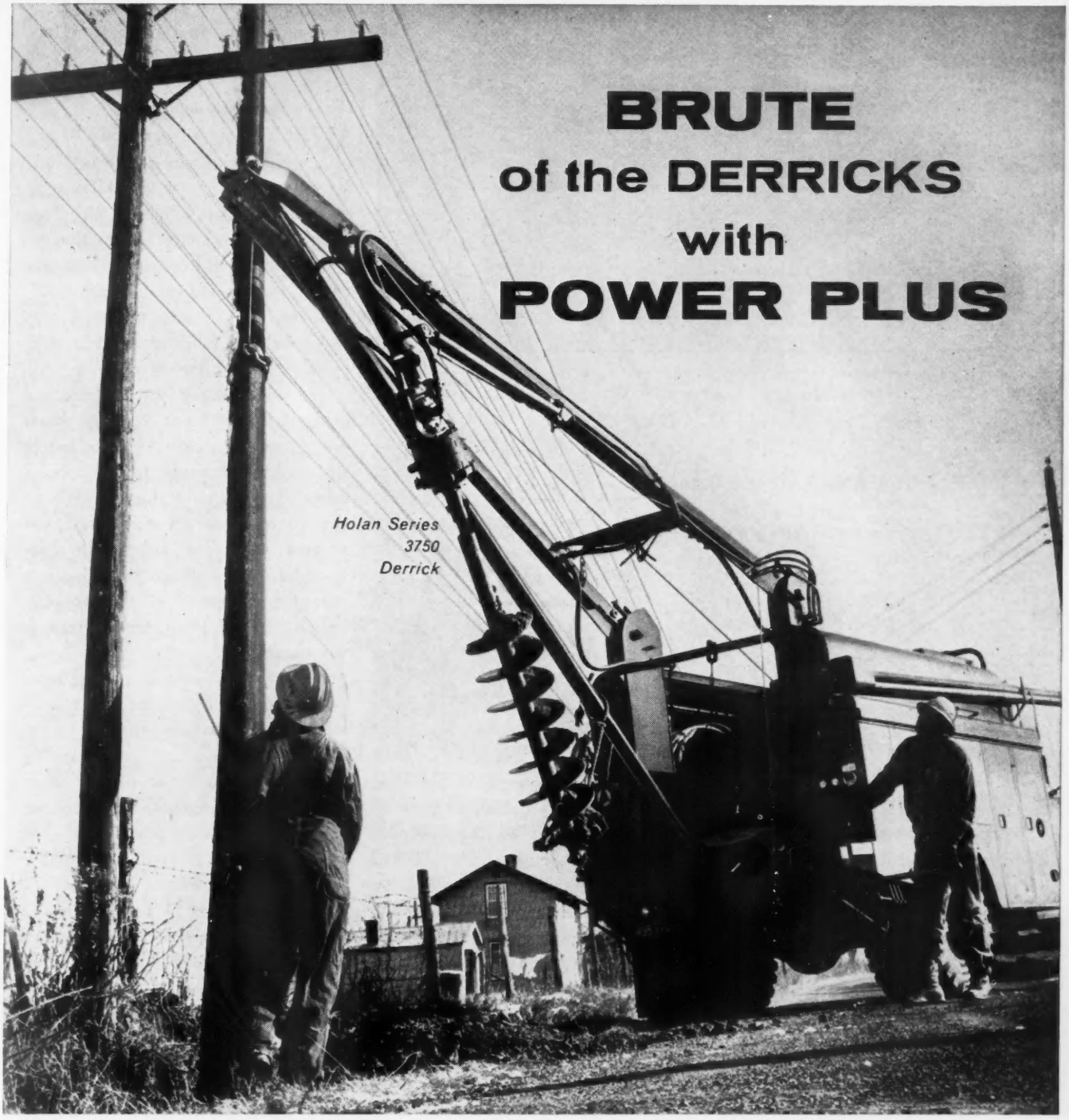
This demonstrates there must be a balance between the service and the cost of providing it.

Now as to the primary question "What is considered essential to good service?" In an observed office the index is supposed to represent the quality of the service the customer receives. It is a *sample* of the service for it is impossible to observe every call. Whether an office is officially observed is something apart from being able to tell whether your service is satisfactory.

"What is considered essential to a good index of service?" Answer: A good index of service is 98-100 points with only fractional point losses in the various measured items.

When we come to the restated question, "What is considered essential to good service?" we make a distinction. Answer: We believe the essentials are accuracy (with perfect accuracy as the objective) and a speed of answer which is considered satisfactory by the subscribers.

The quality and quantity become the layers of the service cake which would be dry without the frosting known as "tone." — *D. A. Perigo.*



It's been called "a brute of a derrick" by utility crews all over the country. That's because the new Holan Series 3750 Hydraulic Derrick with live boom is engineered to withstand abuse in the field.

And the 3750 has plenty of muscle. For the record, it has a 12,000-pound capacity, but it has actually been tested at 22,000 pounds.

An integral middle leg with live-boom action provides extra strength for butt-pulling, body loading and other heavy lifting assignments. The rectangular side legs are fabricated of long-lasting, rust-resisting high tensile steel.

Hoisting 5,000 pounds over the rear axle for body loading is a simple task for the 3750. And the 195° operating range makes it possible to lower the derrick to within five feet of the ground for easy threading of the winch line.

There's power to spare in the 3750—power for such tasks as forcing the Holan 5400 Multiple-Speed Digger shown here into hard and rocky soil. And the extra power makes it easy to remove an auger full of dirt.

Let us tell you more about this new Holan Derrick. Write us—or call your Holan Field Representative—for complete details.

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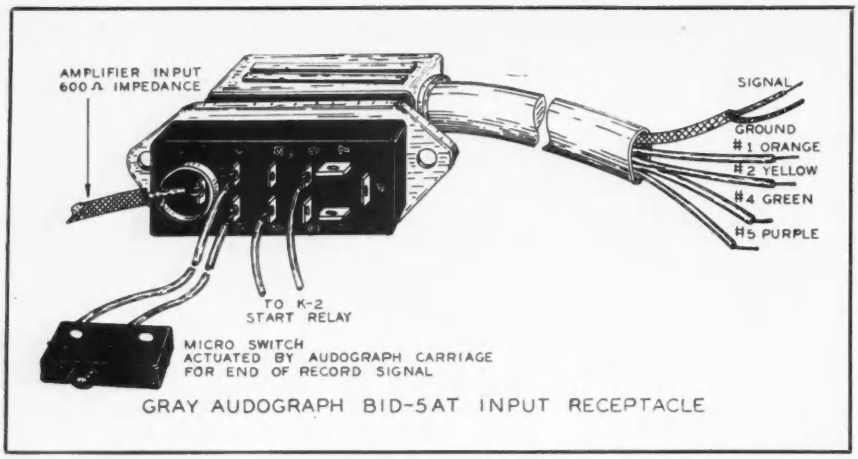


New selective monitoring system eliminates costly and time-consuming "live" observation of repair and service calls.

Repair Service Observation Plan Uses Selector Recorder For Service Calls

TELEPHONE operating companies throughout the nation have adopted a new system that permits the economical and automatic recording of selected repair and service calls on a predetermined basis. The main objective of the new system is to improve over-all quality of service on all customer contacts.

While selective monitoring of service is not new in itself, earlier methods required supervision and personnel which resulted in large manpower commitments and expense. The new system uses the Gray Audograph BID 5AT disc dictation instrument. This unit, designed and produced by The Gray Manufacturing Co., Hartford, Conn., has enabled telephone companies to eliminate costly and time-consuming "live" observation and employ automatic recordings.

Recordings are permanently made on Gray Audograph blue vinylite discs that permit one hour's continuous dictation on each side. The discs are easily filed and stored, cannot be erased and can be played back any number of times. These features create a perfect training tool and insure a higher quality of service. A permanent and actual record of the customer's call eliminates any possible inaccuracies, misunderstandings, or personal opinion of observers' verbatum reports.

The required modifications to make the Audograph compatible to the operating telephone company's system are as follows:

(A) The standard setting of half-speed operation to double the usual recording time (30 minutes) on each side of the disc to one hour per side.

(B) A standby circuit to provide for fast operation of the recorder only when the ringing of a selected call is taking place cuts service costs, and "drive motor" runs only periodically to give longer service.

(C) A modification of the start-stop mechanism to insure instant starting and stopping of the disc and prevent undue load on the drive system. (See D-2 Relay, Input Receptacle Illustration.)

(D) Three wire power cords (see close-up views of installation) for grounding the recording machine — permitting its mounting on a metallic shelf.

(E) A connecting cable to permit: (1) direct connection of the recorder input signal to the output of the 50 B Recorder Connector (Signal and Ground); and (2) a supply circuit (48 volts-50 MA) to start the recorder. (#4 and 5 wires in illustration.)

Gray has made available a service contract, already in effect with a number of leading telephone companies, to cover any possible maintenance problems. This is available from any authorized Gray Manufacturing Company distributor.

Operational Description

WHEN a subscriber dials "114" or the local service special digit for repair service, a line closure is automatically provided on one free circuit directly connected to the repair manual switchboard. For example, suppose 10 circuits are available for this service, this indicates that recording facilities must be provided on all 10 line circuits.

For this purpose, the 10 lines are bridged by 10 trunk circuits. Each one actuates a chain of three relays which feed a signal to a common selective circuit of four relays to step a selector switch at each call, and prepare an audio path to be connected to the Audograph through a recorder connector if the stepping switch reaches a preselected recording contact.

The selector switch is equipped with 20 or more stepping contacts — each contact becomes effective for recording through a corresponding push button switch or jumper when set in "On" position. This permits automatic recording selection of each call over two or three or any number of the incoming calls.

When a call is to be recorded in accordance with the predetermined selection, another bank of four relays is energized to start the operation of the recorder connector and to condition the Audograph in record "start."

Provisions are made to avoid the complete switching operation when the Audograph is not in "ready to record" position, to avoid false operation when the traffic on the repair service lines is too heavy, or when the end-of-disc signal is actuated.

In addition, facilities are provided: to prevent false operation; to disconnect the recorder from the line at the request of a subscriber by operating a key at the repair service switchboard; to actuate audio and visual signals when the end of the disc is reached, and to place the recorder in disabled condition; and to give visual indication for night calls.

It should be pointed out that the

above operational description includes some improvements in comparison with existing selective recording systems already equipped with former model Gray Audographs. Purposes of these improvements are:

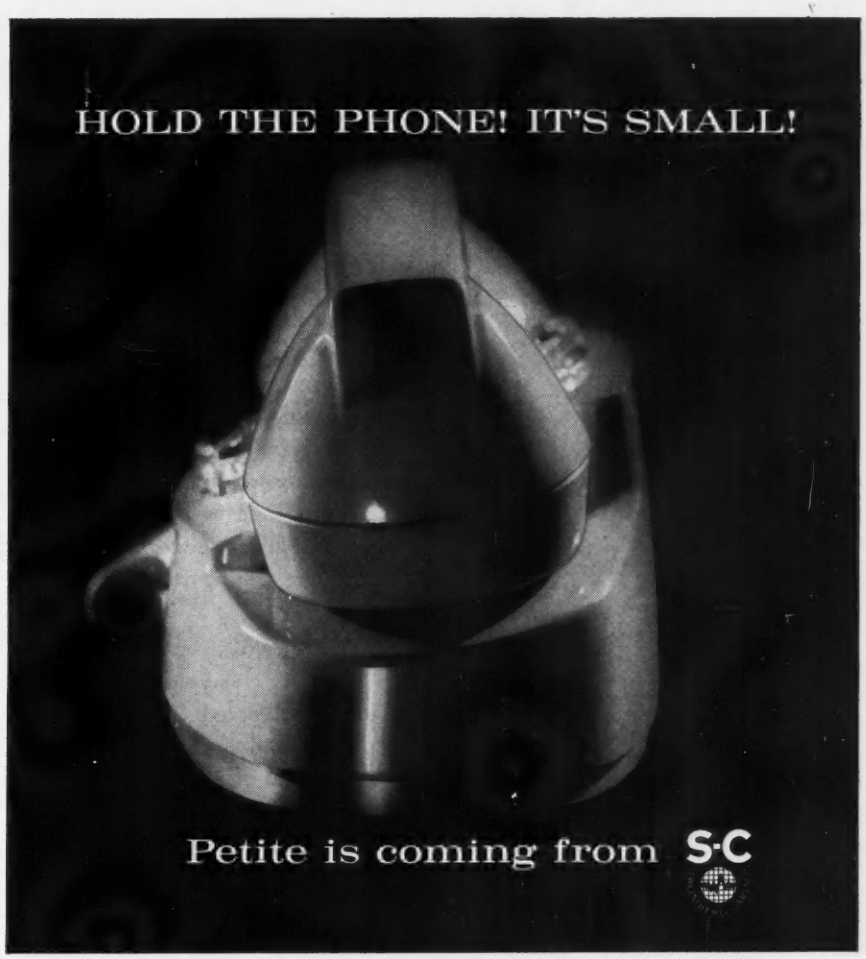
(1) To avoid common ground connections between the recorder and the telephone system.

(2) To avoid replacement of a standard start-stop coil normally operated at 120 volts by a special 48 volt coil.

(3) To provide the shut-off condition of the recorder motor in standby condition.

(4) To add an impedance matching and attenuating network in the audio input circuit of the Audograph for better recording quality.

(5) Finally, to permit the use of a simplified recording machine, easy to install with a minimum number of connections and better facilities for maintenance by Gray Audograph service men.



Purpose Of The Repair Service Observation Plan

THE PURPOSE of the repair service observation plan is to obtain data from observations of repair service customer contacts, and arrive at a new measure of quality of maintenance service.

To establish a uniform scoring and analysis of calls, samples, preferably on a centralized basis in the interest of uniformity and economy of personnel, are taken in sequence ranging from 4-8 out of 20 repair calls as received from customers. They provide a representative (24 hour) picture of repair service calls not usually available with manual methods.

This will give the operating company the opportunity to develop proficiency in the various types of customer comments, and uncover any deficiency. Meanwhile, an accumulative index table of data is being compiled to possibly revise the existing maintenance index.

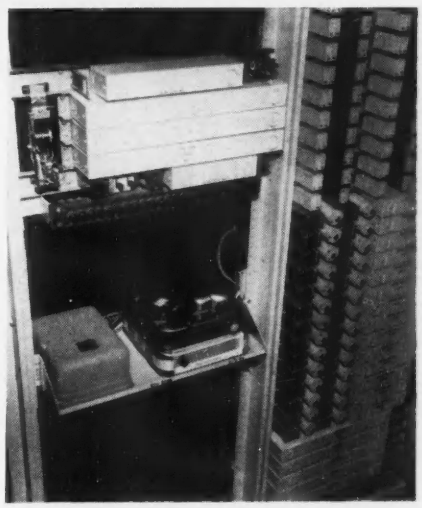
Basic Equipment

THE SYSTEM requires the following equipment: One or more Audograph BID-5AT disc recorders connected to repair trunks; one or more transcribers at branch office for training and educational purposes; and one or more transcribers at evaluation center, according to volume of calls monitored by repair service and number of branches.

The Audograph equipment with suitable alloting and counting equipment is connected to the repair trunks in such a way — (see photo) — that an equitable sample of calls on all trunks is received and recorded on the disc. This method allows discs to be sent from a number of locations to a central point for scoring.

Around the clock samples are taken without extra costs involved wherever "live" manual observing is used. Alloting circuits distribute the calls when the recorder is busy. This assures correct sample size by departing from the regular sample interval until enough calls have been recorded to account for those missed.

On request, an optional playback function can be added to the Gray Audograph recorder. A loudspeaker

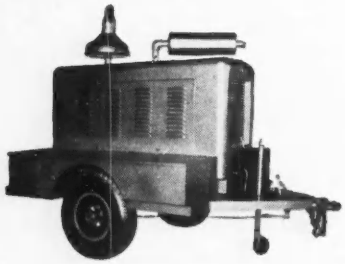


Front view of a 10 repair trunk automatic selective recorder system equipped with a Gray Audograph Recording Machine. Selection of calls to be recorded is made by the operation of keys (22 on front mounting strip). A traffic register located over the No. 4 & 5 keys provides means of determining sample size requirements. A Western Electric 50 B Recorder Connector is mounted on shelf beside the Gray Audograph recorder. Labels on the disc enable the maintenance man to note day, time and number of last repair call shown by traffic register. Location: Southern New England Telephone Co., Hartford office, Conn.

There's VERSATILITY in TELEPHONE SYSTEM SERVICE and Portability with...

U.S.

Complete "versatility" is possible for telephone system service with portable U.S. Versa-Trailer standby emergency power units in sizes from 10 kw to 35 kw capacity.



Units provide both single phase power for lights and 3-phase power for other needs. Many exchanges in an area can be served by a single unit.

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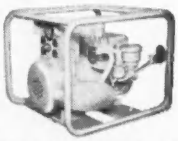
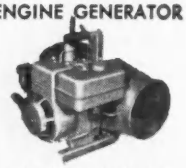


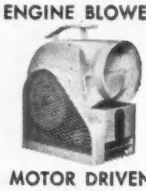
ENGINE GENERATOR

Portable engine blowers provide convenient means of furnishing fresh air to manholes, or for ejecting smoke, fumes, etc.



ENGINE BLOWER

Motor driven blowers like engine driven counterparts, are invaluable for exhausting contaminated air.



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installed inside the system gives the maintenance engineer an opportunity to check the quality and level of the recording before changing the disc. He can report immediately to his supervisor any trouble either in the recorder or the switching equipment.

This playback function is provided by a single operation of moving the top lever from "record" to "listen." Any part of the recording can be played back without damage or accidental erasure. The control knob adjusts the volume for listening. Observing the ready-light signal — green in "record," clear in "neutral," and red in "listen" — eliminates the risk of improper setting of the recording system.

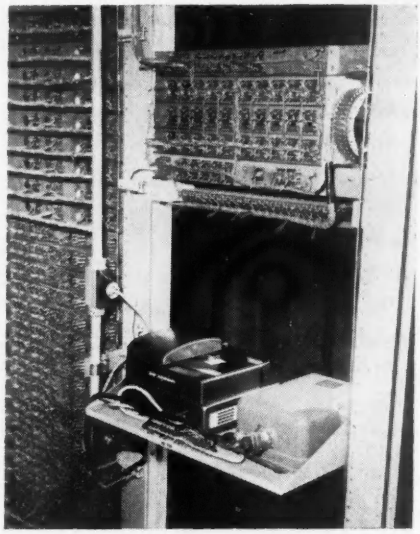
A centralized observing and scoring staff is recommended and it should be divorced from the line of operations and preferably be a part of the general office. This is to assure greater objectivity and uniformity of results. The number of observers, based on sample sizes, makes this the most economical method.

The scoring form would possibly include the following customer comments: (1) Reported this or other trouble before; (2) says he has "had this or other trouble before"; (3) refers to a pending report not cleared; (4) relates this report to installation work; and (5) relates this report to repair or other telephone company work.

Selection Of Samples

SAMPLING is a way to get administrative and operating data without examining and evaluating each transaction in its operation. The sample size can be adjusted to give whatever degree of accuracy that is acceptable. The usual criticism of results that "sample was too small and all unfavorable transactions, or sample taken at the wrong time so nothing but bad performance appeared," generally results from the size of the sample not being adjusted to the expected frequency of occurance. One way to assure this is by taking every *n*th transaction on a continuous basis without interruption.

Many telephone companies have



Rear view of recorder installation. (Top) the ten selective repair trunk circuits; (underneath) the common selective circuit with the recording stepping selector and Gray Audograph controls; (on shelf) the terminal block connections for the Gray Audograph cable; (on left side) the Audograph AC supply cord with grounding lead. Location: Southern New England Telephone Co., Hartford office, Conn.

found the standardization of disc dictation equipment to be advantageous throughout the operation. A new battery model with nickel-cadmium, rechargeable battery is used in the operations department of the telephone company plant for on-the-spot observations: — Chief Engineers for in and out of plant conferences; Construction Supervisors on inspection tours; and Sales Departments for memos and daily reports in connection with the sale of Yellow Page advertising.

The remote control dictation system permits telephone dictation without changes in wiring for offices that have PBX, PAX or other internal dial telephone systems. Dictation facilities are available to everyone with an extension handset and can be expanded to as many outlets as needed. All dictation is transcribed in a central pool. This saves secretary's time and centralizes operations for even greater economy.

Executives of telephone companies use the new Key-Noter "Executive" model with indexing at their respective desks. with the twin, the "Secretarial" transcriber, for their personal secretary's use.

"REGULATION"

(Continued from page 44)

five millions dollars, accumulated 62,000 pages of testimony and lasted nine years.

However, the more competently the commission is staffed the less likelihood there is of big utilities having any great advantage, and the more honestly it is staffed, the more apt both sides are to receive fair treatment.

Engineer in the Rate Case

WHILE discussing staff and before leaving the rate case something should be said of the telephone engineer's place in a telephone rate application.

The engineer is often charged with the responsibility for the design of a rate schedule commensurate with the type of service to be rendered and the cost of supplying such service. He will be called upon to estimate the capital expenditures necessary to render the requested or improved telephone service, the maintenance expense, and possibly decreased maintenance expense, if there are substantial improvements to be made in connection with the rate application.

In each rate application, the engineer should make a study of the adequacy or excess of the depreciation reserve. This is normally referred to as a depreciation study. He will also prepare a cost of service study in those cases where the company or commission is interested in knowing the costs involved in supplying certain types of service or costs of supplying certain groups, classes or categories of customers.

His service may again be required when the commission staff claims that certain company property is not used or useful in the public service or in appraising and determining what property may be devoted to some nonregulated portions of the company's business. In some or all of these matters he may be called upon to testify before the commission.

Other Duties of the Engineer

HOW a commissioner views the duties of a telephone engineer may be helpful at this juncture. In today's telephone field, the engineer is one of the primary necessities in rendering efficient and sufficient telephone service. During the era of small community telephone companies, almost anyone could string a wire and connect it to a central office and be able to communicate with other people in the area. This type of telephone communication is rapidly disappearing, especially since the Rural Electrification Administration has expanded into the telephone field. The metallic circuit, the balanced circuit, the dial instruments and subscriber carrier type service require the special abilities of telephone engineers.

For a community or a group of communities banding together to take advantage of improved sciences in the telephone field, the engineer has many responsibilities and may either make or break the new organization.

First the engineer must be familiar with the economic

RESISTS OLD AGE

THANKS TO "YOUNG PROCESS"!

Kennecott's exclusive "Young Process" lead sheath does much to lengthen the life of Kennecott Telephone Cable. This sheath production method virtually eliminates oxides and impurities! Sheath is far more uniform in strength and burst resistance, with greatly reduced weld area. It provides increased protection against damage and aging. Cable retains full electrical properties over its long life!

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Philadelphia 40, Pa.
Phillipsdale, R. I.
Pittsburgh 33, Pa.
Portland 5, Oregon
Roanoke 15, Va.
St. Louis 10, Missouri
Salt Lake City 15, Utah
San Francisco 24, Calif.
Seattle 1, Washington
Syracuse 3, New York
Tulsa, Oklahoma
Waterbury 20, Conn.*
Wilkes-Barre, Pa.

*c/o Chase Copper & Brass Co.

habits of the territory so that he may design a system that will not soon be outgrown and obsolete necessitating expensive modifications. On the other hand, the engineer must not design a system that will leave much of the facilities unused. An error in design can materially affect the capital investment and the rate base so as to make telephone service an excessive burden on the communities.

After designing the system, the engineer is responsible for the staking of the lines to meet the requirements of the state regulatory commission. So as to help the engineer through uniformity of rules, not only in Kansas but also nationwide, the Kansas Commission in 1957 adopted safety rules for the installation and maintenance of electric supply and communication lines.

These safety rules are comprised of Part 2 and the grounding rules of the latest edition of the National Electrical Safety Code. It has been estimated that by adoption of the National Electrical Safety Code, communication companies doing construction the first year following adoption of these rules saved construction costs in excess of $100,000 over what they would have had to spend under former safety rules.

These safety rules for the installation and maintenance of electric supply and communication lines and the National Electrical Safety Code recognize the fact that other utilities besides communication utilities have a right along our roads and highways It is the duty of the engineer to see that all other utilities are notified, the rights of all other utilities recognized, and that safe installations are planned and built.

The engineer should also make sure that the plans and specifications are followed so that expensive changes are not required which will add to the capital investment of the project. Upon completion of the construction, the engineer has the responsibility of inventorying the constructed plant and dividing the units of property into their proper accounting categories so that the accountants can establish the correct books of account which will meet the requirements of regulatory commissions.

Since the telephone systems of today require a great deal more from management than the old systems of yesteryears, the engineer has the responsibility of consulting with and advising management on proper maintenance practices and acquainting management with its new equipment and system. When the engineer has done all this, he still has not finished his job. The design of the system is usually submitted to the commission, for approval or revision. The engineer still has one job yet to do and that is to see to it that all reports as to the location of the system, the adequacy of the system, and the cost of the system have been submitted to the commission for its information and records.

Summary

A BUSINESS producing a necessary product or service under monopolistic conditions is said to be "affected with a public interest." In both English and American law it has long been recognized that such a business is a proper subject for government regulation, controls requiring reasonable quality and quantity of service and at reasonable rates.

The primary duty of a public utilities commission is to see that the utilities remain in business consistently and regularly giving efficient and sufficient service to all who need it, on terms that are fair and nondiscriminatory and at rates that are the lowest possible consistent with good management and at rates which will provide a reasonable rate of return for those who have invested their money in the business.

In order to do this the regulatory body usually requires the filing of periodic financial reports, tariffs, rules and regulations and other data. It investigates complaints in regard to service and charges, orders corrective action where needed and passes upon all requests for changes in rates. Supervision over the accounting practices of the utility and its capital structure and authority to act to prevent the ratepayer from being saddled with the burdens attendant in overcapitalization are proper functions of the state.

The commission must base its actions and decisions on facts and not its personal wishes or the personal "druthers" of politicians, ratepayers or the public. The commission should take every precaution to see that its staff adequately represents the ratepaying public.

Accounting and engineering data are most important in regulatory practice and particularly in rate hearings. There is no adequate substitute for such data if the regulatory process functions intelligently and properly. — *Marion Beatty.*

References

(1) All above quotes taken from the U. S. Supreme Court Decision of 1877 in Munn vs. People of Illinois, 94 US 77.

(2) Leo Nebbia vs. People of the State of New York, 291 US 502, 536 (1934). Also see "Economics and Public Utilities" by Eli Winston Clemons (1950).

(3) The following cases established the authority of the ICC to require uniform systems of accounts. State authority also exists: Am. Tel. and Tel. Co. vs. U. S., 299 U. S. 232 (1936). Norfolk and Western Ry. vs. U. S., 287 US 134 (1932). Kansas City Southern Ry. vs. U. S., 231 US 423 (1913).

(4) See 41 American Law Reports 889-925 (1926). For example of state statute conferring upon the commission broad authority over issuance of securities see General Statutes of Kansas 1949, 66-124-127.

(5) Public Utilities Fortnightly, Jan. 15, 1959, by Herman L. Gruehn.

EDITOR'S NOTE

If you missed Parts One and Two of Mr. Beatty's article on "Principles of Regulation," refer to the March 15 issue for Part One, and the April 1 issue for Part Two.

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"Coordination of Carrier"

(Continued from page 46)

the time for the relay to release as it sustains the circulating flux around the coil, with the lower resistance providing the longer time lag and hence reducing the percent break.

Note that the shunting resistance has no effect on the operate time of the relay as once the ground has been connected to the circuit, the coil and resistance are effectively in parallel, with the flux of the coil increasing at its own rate. A similar action takes place with the SG1 relay of *Figure Three* in which a fixed shunt resistance is used to preset the value of percent break from the channel unit. The actual percent break, however, may be adjusted by means of the potentiometer "BIAS" in the signal discriminator circuit of the channel unit. The carrier terminal may thus be set to provide optimum pulse ratio into the inter-toll trunk circuit.

It should be noted that the shunting resistance across relay SG1 also acts as a spark supression circuit for the pulsing contacts of the channel unit E lead as a portion of the back emf of the coil is bypassed to ground through the resistance when the circuit is broken by the impulsing contacts.

Due to the usual length of cabling between the carrier channel unit and the E & M trunk circuit, contact suppression, consisting of a condenser and resistance in series, is placed across the channel unit pulsing contacts to reduce arcing and burning of the contacts. A value of 25 ohms has been established as the maximum amount of series resistance that may be allowed between the carrier channel unit and the E & M trunk circuit in the interests of uniformity in pulsing performance of large trunk groups.

This value may readily be exceeded on specific trunk and carrier equipment but where an inter-toll trunk circuit may be patched in an emergency to composite signalling equipment or to various types of relay or varistor bridge signalling equipments the 25 ohms provides for over-all reliable pulsing performance.

The percentage break of the polar type relay PB in *Figure Three* is varied by strappable resistances which vary the current through the biasing winding of the relay.

Open-Battery and Ground-Battery Pulsing: — Two types of signalling options are normally available on the M lead of E & M trunk circuits as shown in *Figure Seven.* With the open-battery option, the M lead is open when idle or in the break period of dial pulses, and has battery applied when seized or in the make period of dial pulses. This system is used with Lenkurt 32, 33 and 42 series carrier systems and is a strappable option with 45-class carrier systems.

With the ground-battery option, the M lead is grounded via the back contacts of the pulsing relay when idle or in the break period of dial pulses, and has battery applied when seized or in the make period of dial pulses. In the latter condition a 1000-ohm resistance is also connected between the M lead and ground to reduce arcing and burning of the pulsing relay contacts. The graph of *Figure Seven* illustrates the fixed break period (for a given relay) of the open-battery pulsing.

The 1000-ohm resistance to ground added for ground-battery pulsing does not affect the operate characteristics of the relay during the period in which battery is applied to the relay. At the end of the pulse, however, the relay releases and the circuit then appears as in B of *Figure Seven* during the transit time of the relay. The resistance alone without ground on the back contact of the relay has the effect of increasing the release time of the relay by an amount T_1.

At the end of the transit time of the relay, ground is applied to the coil with the circuit appearing as in C of *Figure Seven.* The result is to increase further the release time of the relay due to the low resistance path for the circulating current in

the relay coil which sustains the magnetic flux in the coil.

Voice Transmission

AS ANY EQUIPMENT involving amplifiers is necessarily uni-directional, the external voice connections of the channel unit shown in *Figure Three* appear as a four-wire circuit designated MOD for the sending pair and DEMOD for the receiving pair. The toll switching equipment, however, uses a two-wire circuit, i.e. transmitting and receiving on the same pair. The conversion from four-wire to two-wire operation is accomplished by a Four-Wire Terminating Set.

Coil Type Four-Wire Terminating Sets: — Four-wire terminating sets may be of the resistance hybrid type usable for short channel drops to toll switching equipment, such as in No. 5 "end" offices and terminal links in No. 4 "toll centre" offices, or may be of the transformer hybrid type as shown in *Figure Three* suitable for the exact adjustment of toll circuit net loss and with a high degree of balance suitable for No. 1, 2 and 3 office (primary centre, or higher), and for intertoll circuits of No. 4 offices. The transformer or coil type hybrid is preferred in inter-toll dialing practice due to the rigid requirements for circuit net loss in the nationwide toll switching plan.

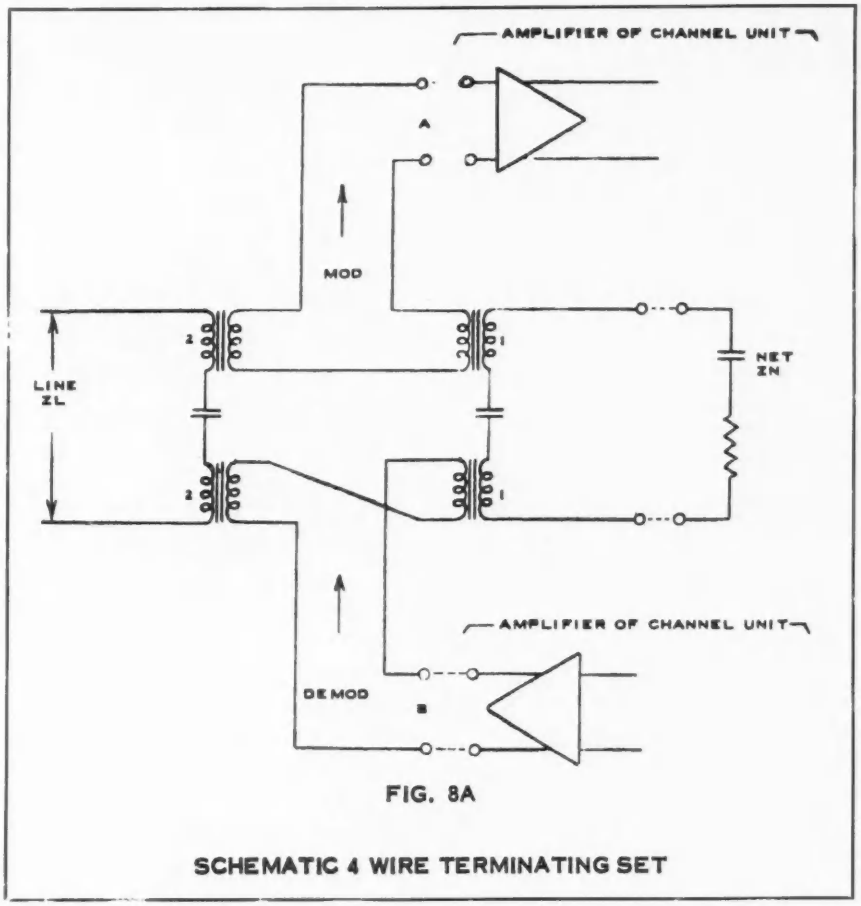


FIGURE 8A: — Schematic of 4-wire terminating set.

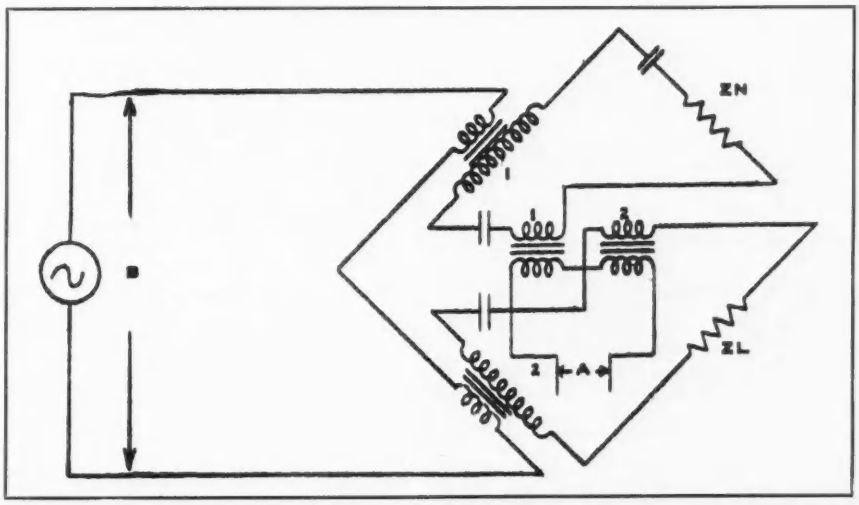


FIGURE 8B: — Four-wire terminating set redrawn in Wheatstone bridge form.

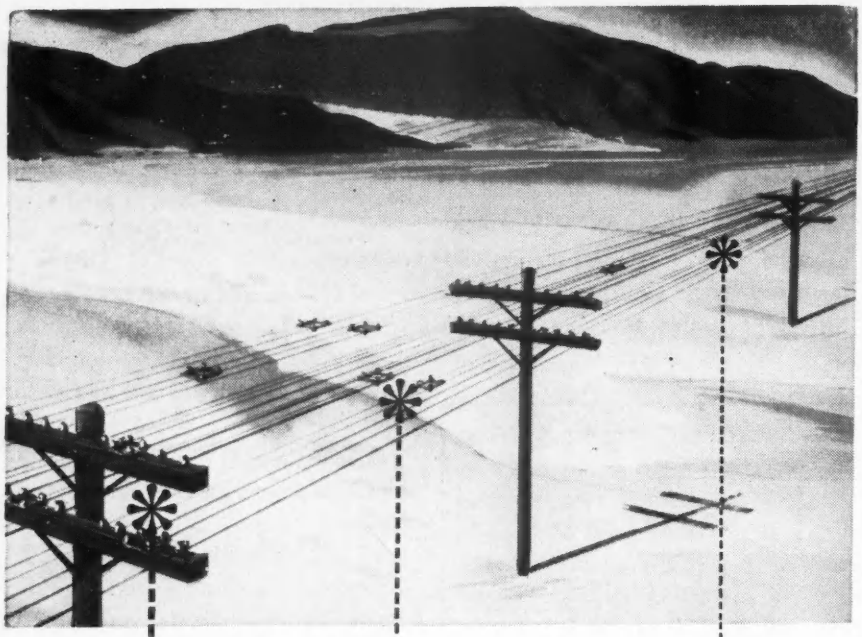
A schematic of a modern precision balanced four-wire terminating set is shown in *Figure 8A*. ZL represents the external line impedance, with ZN representing a network which approximates the line impedance as close as possible over the transmitted frequency range. A is the input impedance and B the output impedance of the amplifiers. *Figure 8A* may be readily recognized as a Wheatstone bridge circuit if redrawn as per *Figure 8B*.

Considering the *Figures 8A* and *8B*, if the impedances (1) and (2) of the hybrid coil are equal and ZL=ZN and if voice from the DEMOD is represented by a generator connected in series with B, there will be no voltage across A.

Thus, the input of one amplifier is effectively isolated from the output of the other and the repeaters will be stable in the frequency range where the impedance balance applies. If it is assumed that all windings of the hybrid are equal, that ZL = ZN = 600 ohm, B will be 600 ohms for maximum power transfer. Only half of the energy delivered by the DEMOD amplifier at B is passed onto line ZL with the other half being dissipated in ZN.

Considering speech in the opposite direction, voice energy received from the line is represented by a generator in series with ZL. One-half the voltage across ZL will appear at A if there is no current through winding (1) and network ZN. Therefore, one-half of the energy delivered from the line to the four-wire terminating set is passed onto the MOD input and

Please turn to page 74



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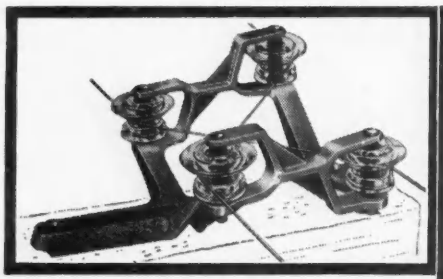

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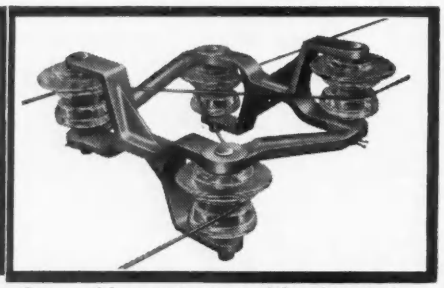


Case mid-span transposition bracket

one-half dissipated in the opposing amplifier output B.

Resistance Hybrid: — A resistance hybrid is normally used where a carrier channel is to be operated two-wire directly into a toll switching trunk with no lengthy intervening cabling, and where toll circuit net losses are not as critical, such as on point-to-point terminal toll circuits. A schematic of the plug-in resistance hybrid used in the 4501A channel unit is shown in *Figure Nine*. Note that the

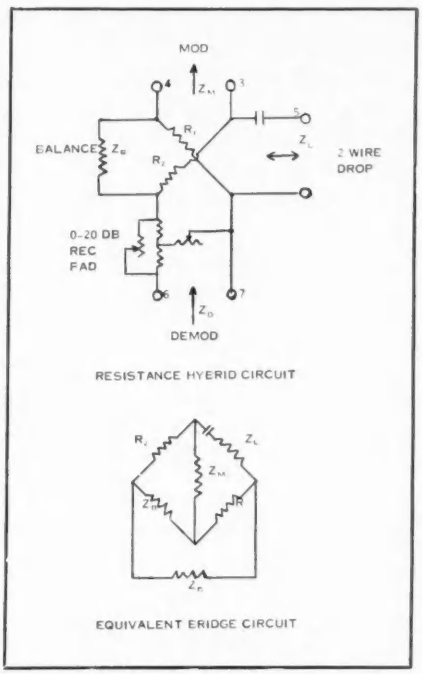


FIGURE NINE: Resistance hybrid.

ZL, MOD and DEMOD resistances are provided by the line impedance, MOD and DEMOD impedances respectively.

Compromise Networks vs. Precision Networks

FROM THE discussion of the coil type hybrid, it is seen that the trans-hybrid loss or balance is a function of how closely ZL = ZN. If the losses across the hybrid are not greater than the level difference between the MOD and DEMOD of a carrier channel — "singing" occurs as a feedback action DEMOD to MOD takes place. A compromise network of 600 ohms impedance, composed of a 600-ohm resistor and 2 mfd condenser, is normally used when operating a carrier channel into a two-wire toll switching trunk (as shown in

Figure Three) as the trunk circuit plus office wiring, etc., approximates 600 ohms.

If the carrier channel were to be extended two-wire to trunk equipment a distance away using open wire or cable pairs, the line impedance would not be 600 ohms. Thus to allow proper drop levels to be set without singing, a precision network is used. Standard precision networks are available to match the impedance of most open wire or cable pairs.

Voice Circuit Drop Levels

REFERRING TO *Figure Three*, it is seen that the four-wire 1000-cycle voice frequency levels at the output of the channel unit may be either +7 or +4 dbm at the DEMOD and —16 or —13 dbm at the MOD depending upon whether optional 3 db pads are plugged into the channel unit.

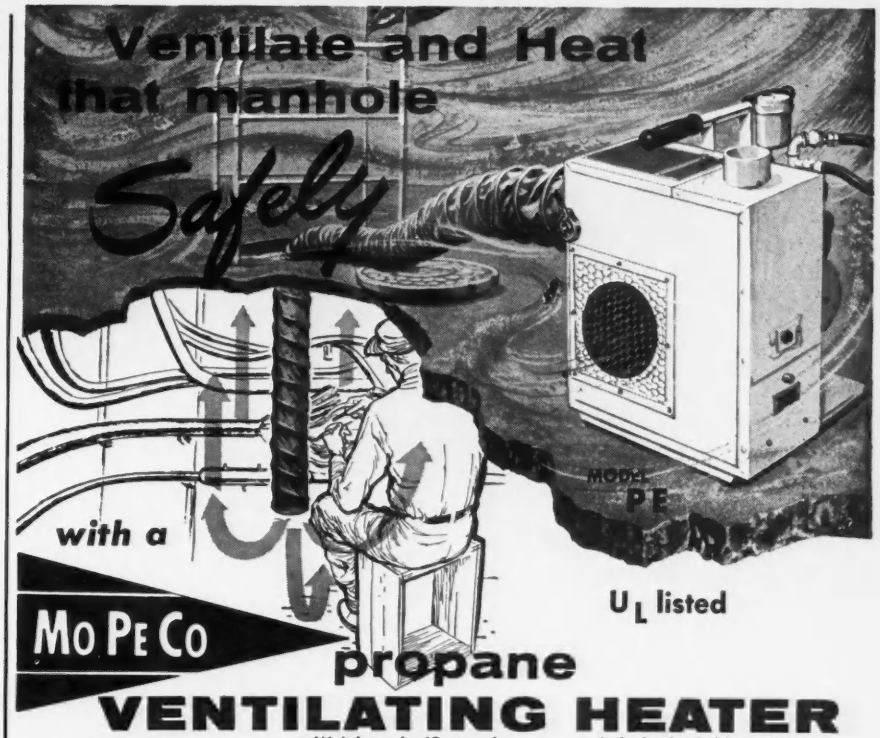
The loss in the four-wire terminating set is approximately 4 db. The values of the TRSG and REC pads in the four-wire terminating set are calculated to produce the required loss at which the toll circuit will be operated, as specified by the Toll Transmission Engineer. In this instance a 4 db loss circuit is shown.

Note that the levels stated above are test tone levels at 1000 cycles, used to adjust the toll circuit so that it will operate correctly. Actual telephone conversations may vary in level from +8 dbm to about —50 dbm.

Conclusion

IT MUST BE appreciated that the discussion in the foregoing paragraphs has only involved the interconnection of specific inter-toll switching equipment with specific carrier equipment and that many varieties of both, and their applications, occur in practice.

The author wishes to acknowledge the assistance of the engineering staff of Lenkurt Electric Co. of Canada for the constructive suggestions as to the technical content, L. J. Alfreds for assistance with the Pulsing Considerations section and G. F. MacFarlane, automatic equipment engineer of the B. C. Telephone Co. for inter-toll dialing information.



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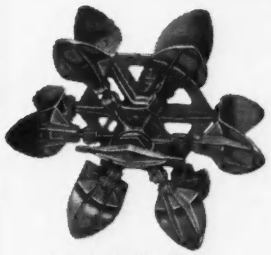
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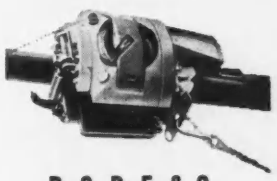
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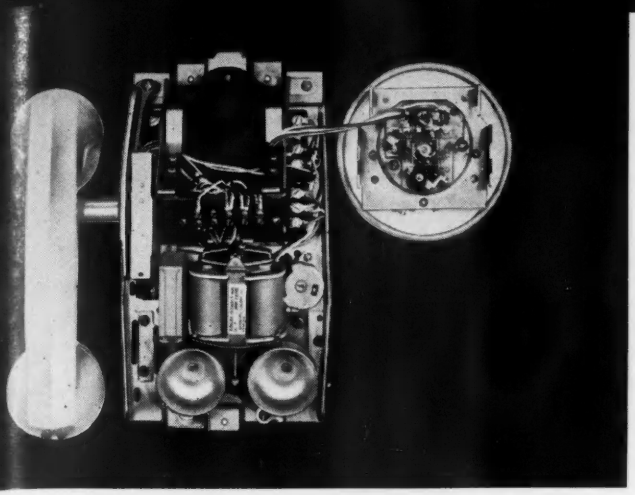

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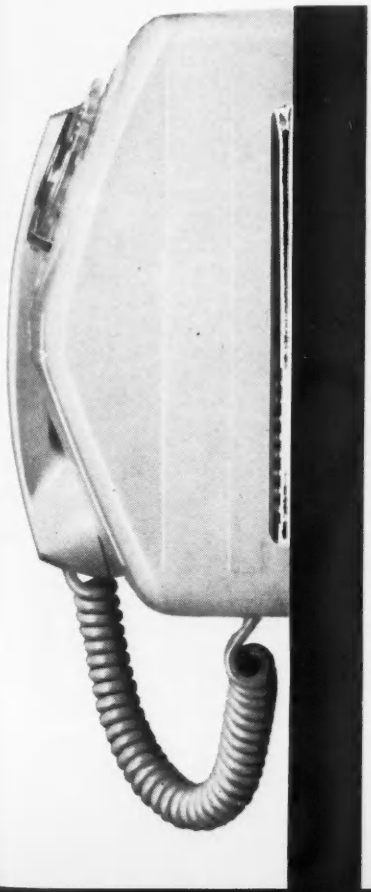

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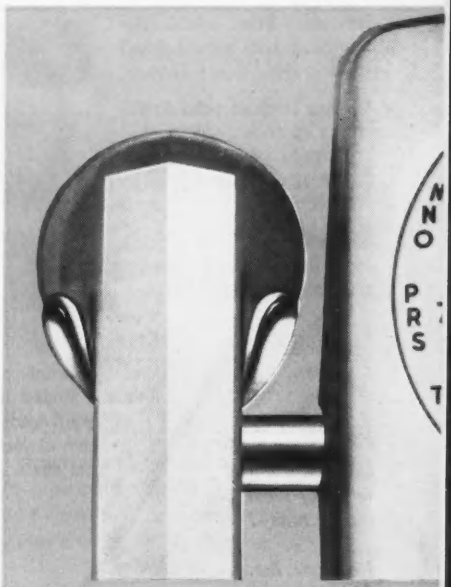

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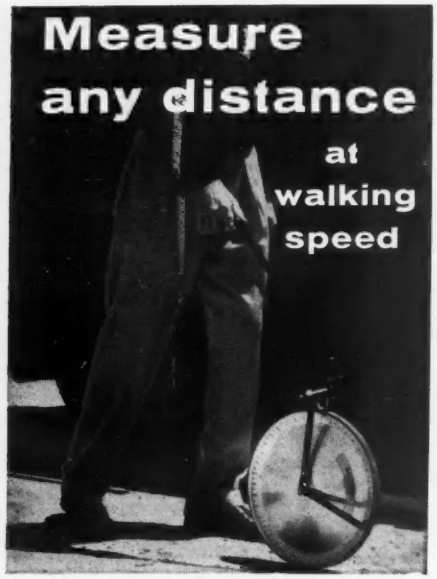

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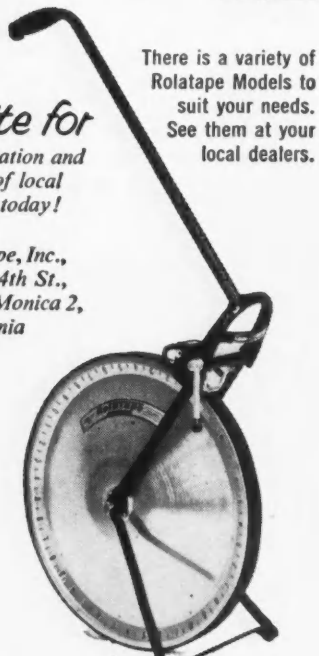

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NEW EQUIPMENT

(Continued from page 49)

manuals for the proper operation and maintenance of this ventilating and heating equipment.

Propane Aerial Tent Heaters

PROPANE aerial tent heaters are useful for providing heat in inclement weather for cable splicers working on aerial cable. The heater illustrated in *Figure* 18 is designed to give safe dependable heat in cold, wet, or windy weather or under snow or ice conditions.

Two models are available. One is an 8000 BTU type and the other, a 12000 BTU unit. The 8000 BTU model provides approximately 50 hours of heat at maximum capacity from a 120 pound propane tank. The 12000 BTU unit furnishes approximately 35 hours of heat from the same capacity tank.

Both types of tent heaters are hung from the cable messenger by means of two four-inch cranes provided as standard equipment. The hanging height is adjustable by means of snap hooks.

A low pressure regulator is employed on both models and a hand control valve adjusts the height of the frame.

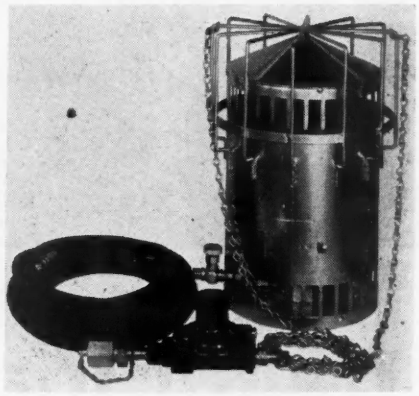

FIGURE 18: — Propane aerial tent heater. (Morrison-Pelsue Company)

Mobile Powered Plants For Construction Work

SOME companies, particularly those in the electrical utilities group, have been making use of portable power plants in their construction trucks to provide power for operating power type tools, motors and electric lights as well as communication equipment mounted in the truck.

Mobile communications plus auxiliary power units place an extra

FIGURE 19: — Truck mounted power plant providing 2000 watts power for lighting and operation of power tools. (D. W. Onan and Sons, Inc.)

heavy strain on the truck battery. The usual method of transmitting the power supply is to employ alternators and rectifiers or larger generators for battery charging to take care of the extra load. Even then it is necessary to run the truck engine in order to provide the power continuously. Such extra power results in using up more gasoline than is economical.

In such cases, the use of a separate power plant would be justified. The auxiliary power plant has its own engine and may save as much as six to ten gallons of gasoline per day, paying for the difference in the cost between a truck generator and the auxiliary generator unit. Even an engine of less than 2 horsepower will do the job. In addition, truck engine maintenance is reduced, thus prolonging the life of the engine. *Figure* 19 illustrates the use of an auxiliary power plant to supplement the truck engine. While the power plants are available in capacities from 500 to 200,000 watts, 1,500 to 2,500 watt sizes will provide ample power.

This plant is available as manual hand cranked, remote electric started or as portable unit in a cradle.

The power generator and engine may be mounted permanently in a compartment in other designated space, or carried in the cradle for portable use outside the truck. The associated charger unit may be mounted permanently or kept in a portable form for use in other locations. The charger is connected to the generator and the truck is connected to the charger to maintain the battery for communications use.

Combinations of 1000 or 2000 watt AC plant with high 30 amp, 12 V charging equipment may be employed to provide supplemental supply to the truck battery sufficient to handle mobile communications and light supply from the battery. A special relay is provided to prevent the truck battery from being charged by both the truck generator and the power plant at the same time. — *John S. Reed.*

EDITOR'S NOTE: — If you want more information on equipment described in Mr. Reed's article write TE&M.

1 NO. 125 ELECTRICAL FILLER TAPE

Fills voids in splice bundle in a matter of seconds . . . provides foundation for subsequent tape layers . . . a ⅛-inch thick insulating compound in tape form that can be molded by hand to comfirm to irregular shapes and contours.

2 BI-SEAL SELF-BONDING (polyethylene based) ELECTRICAL TAPE

Is the strong moisture barrier. Layers fuse so tightly it's impossible to delaminate them. Excellent chemical, mechanical and thermal properties. Bi-Seal has no right or wrong side; will not stick or tangle during application; workable to—40°C.

3 BISHOP VINYL ELECTRICAL TAPE

No. 1 (7-mil) and No. 2 (10-mil) is used for final abrasion-resistant covering. A thin, tough, resilient, pressure-sensitive tape with great adhesive strength. Also popular as an all-purpose tape for general splicing jobs.

Complete information on these and other outstanding Bishop Tapes sent on request.

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MORE THAN A CENTURY OF ELECTRICAL INSULATION

BISHOP MANUFACTURING CORPORATION

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CEDAR GROVE (ESSEX CO.) N. J.

New Products' Showcase

SUPPLIES AND EQUIPMENT

By DICK REYNOLDS

Cable Damming Equipment

SEMCO SALES & Service, Inc., has developed two new products; a two-component SemKit, and a 755 Applicating Gun, to insure proper mixing and application of damming resin.

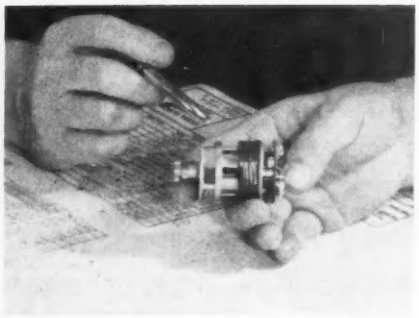
Features of this product are: (1) eliminates all contact with resin during mixing and application; (2) no transfer of the resin from the mixing container to the applicating gun; (3) proper proportioning of the resin and catalyst — no possibility of incorrect proportions; (4) no clean up of equipment or personnel. *Check NP* 437.

Semco Sales & Service SemKit and 755 Applicating Gun.

Polarized Motor

THE DEVELOPMENT of a new high torque polarized motor with the stall current equal to the low running current has been announced by the Diaphlex Division, Cook Electric Company.

Unit has a high starting and running torque for a given watt input,



and current consumption is nearly constant, even with locked rotor or load variations. The motor is activated by synchronized impulses and a sealed circuit may be remote from the motor. *Check NP* 438.

Crows' Nest Aerial Ladders

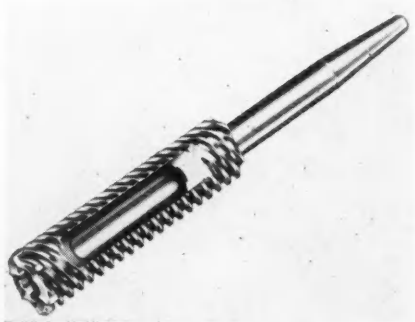
CROWS' NEST ladders, from Industrial Systems Co., are available in lengths of 29′, 32′9″ and 36′8″ for mounting on auto trucks, and up to 80′ for in-plant or special use on portable bases.

The ladders permit inclinations to 72° and a full rotational sweep of 360°, a collapsible platform that adjusts to desired position and angle, semi-automatic operation which allows full manual control at all times,

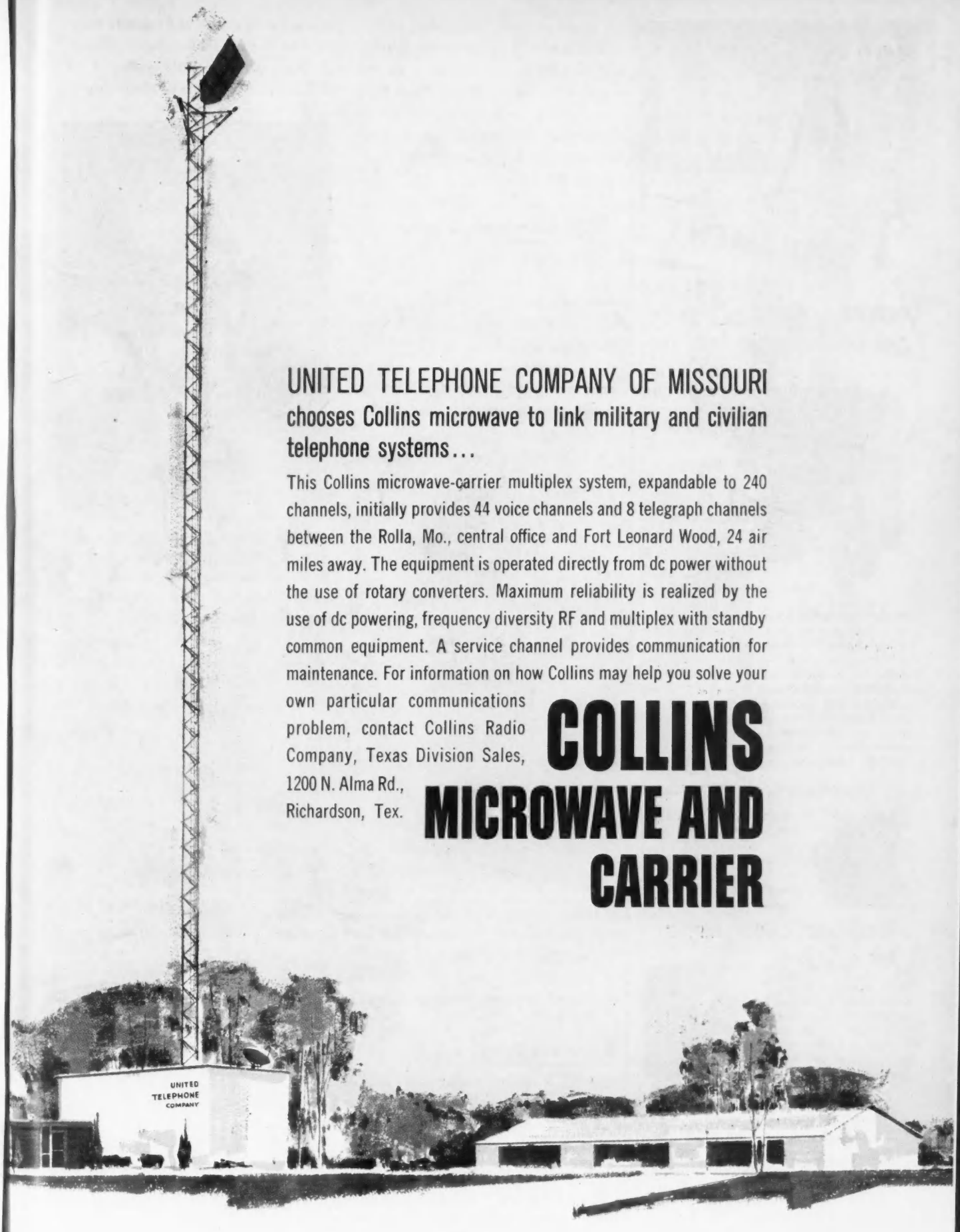
steel trussing and rung ferrule braces to reinforce ladders, and side sway, weave and sag are eliminated. *NP* 439.

Hammer Bit

A NEW tungsten carbide tipped Hammer Bit in sizes 3/16″ through 6″ diameter has been developed by Tilden Tool Manufacturing Company. These bits are of the solid chisel



point type through 5/8″, and core type with patented core slot in the larger sizes having multpile carbide cutter. The bit drills only the perimeter of the hole, thereby increasing the capacity of the hammer and drill-



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This Collins microwave-carrier multiplex system, expandable to 240 channels, initially provides 44 voice channels and 8 telegraph channels between the Rolla, Mo., central office and Fort Leonard Wood, 24 air miles away. The equipment is operated directly from dc power without the use of rotary converters. Maximum reliability is realized by the use of dc powering, frequency diversity RF and multiplex with standby common equipment. A service channel provides communication for maintenance. For information on how Collins may help you solve your own particular communications problem, contact Collins Radio Company, Texas Division Sales, 1200 N. Alma Rd., Richardson, Tex.

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TEST EQUIPMENT

Locates Trouble FAST

COMMUNICATION TEST SET

Enables Carrier and Line Check at both 1000 Cycles and Carrier Frequency.

Set consists of TRANSISTOR OSCILLATOR Model J, DB METER Model K, Case and Leads.

TRANSISTOR OSCILLATOR MODEL J — Voltage output, O, -13, -16 DBM Frequency, 1000 Cycles; Output Impedance, 600 Ohms; Power, Self contained 700 hour mercury battery. Stable in frequency and voltage.

DB METER MODEL K — in 4 ranges from -20 +42 DBM. DB Scale, red; 1, 5, 25, 125 Volts. Scale Black. Frequency response, up to 600 k. c. Minimum impedance, 18 K Ohms. Self contained loads, 150 and 600 ohms.

LEATHER CASE with space for Lead Sets.

LINEMAN'S TEST SET

MODEL H — STANDARD FOR 40 YEARS. For open wire testing. Don't cut wires or skin off insulation. Lamp for locating distance to fault. Talking circuit.

STEWART CABLE TESTER

MODEL L — SIMPLE, TO USE. SAVES TIME. More accurately locates cable faults. Only tester with "tone-test" features and fishtail exploring coil with neutral pickup coil and head-phone.

SPEED CABLE TESTER RESULTS by using the EXPLORING COIL AMPLIFIER, MODEL E. Increases Head-phone tone more than 100 times. Pocket Size.

STEWART BROTHERS
Division of Instrument Laboratories
315 W. WALTON PL., CHICAGO 10, ILL.

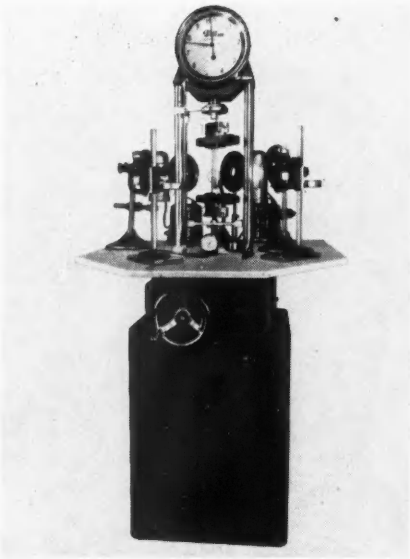
ing speed in hard masonry or rock.

The bits will operate in self rotating electric or air hammers as well as standard hammers employing turning chucks. Removable extension shanks and extra length bits are available for sizes 1 1/8" through 1 1/2". *Check NP* 440.

"Xpandable" Work Base

THE NEW Dillon "Xpandable" work platform is portable and easy to install. It facilitates almost unlimited tests of tensile, compression, transverse and shear loadings.

The illustration shows a complete polorized light set-up for checking plastic specimens in tensile. The



tester is 0 — 10,000 pounds capacity. Also available is 0 — 250, 0 — 500, 0 — 1,000, 0 — 2,500, 0 — 5,000 and 0 — 7,500 pounds capacity.

Dillon testers are hand operated or may be ordered motorized in four standard sizes with daylight openings of 13", 20", 30" and 40". Wide selection of gripping fixtures. *NP* 441.

Rainwear Protection

A NEW line of rainwear protection is now being introduced by the Davis Emergency Equipment Company, Inc. The protective suit, composed of jacket, overalls and hood, is marketed under the name Davis Jetsun Clothing.

Small enough to be carried, when folded, in the glove compartment of a car, the suit is for use by those who work out of doors and wish to carry rain gear with them.

Made of lightweight yellow Vinyl film, the suits have electronically

welded seams, plastic buttons, reinforced plastic buttonholes, and air vents under the arm. A full cut is featured for free action without binding. The suit is available in medium (36-40) and large 40-44, is resistant to oils, chemicals and acids, will not stiffen at 20 degrees below zero, and is washed in detergent. *Check NP* 442.

Ratchet Hand Benders

A NEW ratchet-action hand bender for making full 90° bends in 1¼" and 1½" rigid conduit and pipe sizes has been announced by Greenlee Tool Co.

Features of the unit include easily reached ratchet release, built-in bend-

ing gauge for bending to specifications or making duplicate bends, and

pipe clamp that swings away for fast loading and unloading. Bender has T-iron base threaded for 1¼" pipe legs so that it can be bench or floor mounted. Unit is transported and set up by one man. *Check NP* 443.

Transistor Index

A TRANSISTOR Index used to facilitate selection of transistors, consists of a deck of punched Keysort business cards. Each card describes a particular transistor by means of sorting slots and data printed on the card. Selection is accomplished manually by means of a keysort needle. Sorting on all ten available parameters is accomplished within two or three minutes.

For unique requirements, approximately 40 unused holes are available for insertion of additional data. It contains data on substantially all military and commercial transistors manufactured by 32 major companies. *Check NP* 444.

Carbide Drills

SPIRAL carbide-tipped masonry drills with deep flutes and closely-controlled diameters have been introduced by The Rawlplug Company. Both types are for use with high-speed electric drills.

The drills have brazed-in carbide tips for support against shock. The

pivot point, at the geometric center of the carbide tip, directs the full force behind the drill against the center of the tip for quicker drilling with less of the usual tendency to "walk."

Drill diameters range from .132" to 1.535" and over-all lengths from 2½" to 10". Sizes available run from ⅛" to 1½". *Check NP* 445.

International Harvester model B-100 truck equipped with new 89-inch long service-utility body has unobstructed interior width of 48½ inches in the body. Seven new service-utility bodies have been introduced for International light-duty trucks. Lengths from 79 to 100 inches and open or fully-enclosed models are offered. *Check NP 446.*

NEW PRODUCTS' DEPARTMENT **5-15-60**
Telephone Engineer Publishing Corporation
7720 North Sheridan Road,
Chicago 26, Illinois

ATTN: Dick Reynolds

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WIRE OR CABLE
Terminal
PEDESTALS

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B 700 W Pedestal

B 700 W Pedestal

B 900 Pedestal

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Made especially for construction where buried plant facilities are employed. Superior Pedestals are available in three basic terminal pedestal designs.

For a single buried wire or for a cable as large as 400-pairs, Superior Pedestals provide a quick and simple method of installation . . . puts your outside buried plant in service without delay!

The pedestals, made of heavy steel, hot-dipped galvanized after fabrication, are supplied complete with all mounting hardware, terminal support brackets and grounding lug.

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TELEPHONE ENGINEER & MANAGEMENT's

PLANT MAN'S 'SPEC' BOOK

(7) Cable Pressurization Procedures — Installing Pressure Plugs, Contactors, and Valves

They are spaced in a straight line across the center of the cable opening like the teeth of a comb. A pin chuck, tap wrench, or similar tool is necessary for holding pins during insertion. Pins are inserted with a pushing and twisting motion. (Note: The channeling pins form open channels in the conductor bundles which the resin will follow permitting complete saturation of the entire bundle.) The pins are made of an excellent insulating material. Accidental scuffing of the insulation as the pin is inserted will not result in lost pairs, since the pin — which is an insulator — remains in place.

Pins should not be driven through the bundles like nails but worked through with a pushing, twisting motion to avoid any cable damage. (Note: Channeling pins are not required for cable having plastic insulated conductors.)

7. After clipping off excess channeling pin length, wrap the sheath opening with spacer tape (a screen-like tape, "Scotchcast" P-3) to the desired build-up as shown in *Figure Six*. Level wind the spacer into

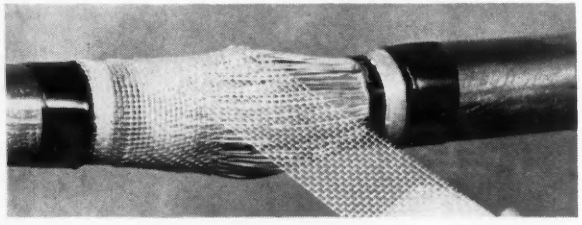

FIGURE SIX.

TELEPHONE ENGINEER & MANAGEMENT's

PLANT MAN'S 'SPEC' BOOK

(8) Cable Pressurization Procedures — Installing Pressure Plugs, Contactors, and Valves

the opening with the first serving extending the full length of the block onto the cable sheath. The remaining servings are also level-wound, but made successively shorter, until the recommended diameter is reached.

8. After the spacer tape build-up, an injection fitting with a one-way valve ("Scotchcast" P-1) is placed over the pins. A liquid-tight envelope of 1½-inch wide plastic tape ("Scotch" brand No. 22) wrapped

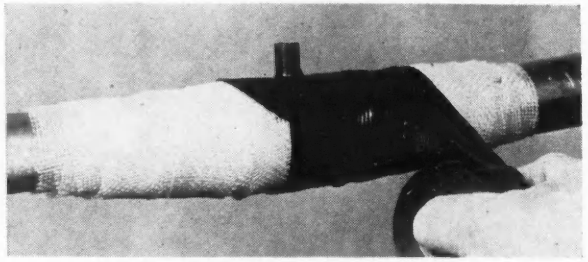

FIGURE SEVEN.

in two half-lapped servings is applied over the spacer tape build-up, tying in the injection fitting as indicated in *Figure Seven*. The two servings of plastic tape provide extra pressure resistance.

9. Wrap the block with restricting tape, ("Scotchcast" P-4) starting at one end and using a long spiral wrap (*Figure Eight*). Be sure the entire area is covered with a minimum of two layers applied as tightly and conformably as possible. This restricting tape acts as a tire casing over the plastic tape

TELEPHONE ENGINEER & MANAGEMENT's

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(9) Cable Pressurization Procedures — Installing Pressure Plugs, Contactors, and Valves

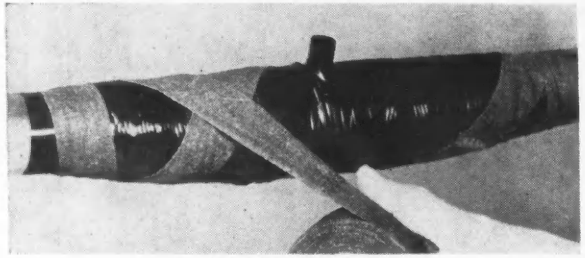


FIGURE EIGHT.

which acts as an inner tube under resin pressure. Apply two tight constricting bands of filament tape at the ends of the block to form a tight seal between the tape and the sheath.

10. Place the prepared resin container in a pressure gun (Model E-4) and inject the resin into the block until no more resin can be pumped (*Figure Nine*). Maintain pressure for 3 to 5 minutes longer to allow paper insulation to absorb the resin. The pressure developed in this type of block is quite high. (Note: The plastic envelope around the block is used in preference to a lead sheath because the plastic will expand and contract with the resin to prevent the formation of voids in the block.)

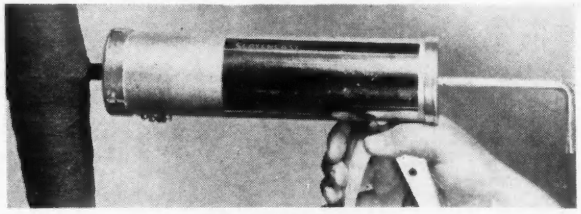


FIGURE NINE.

More Data For Your "Spec" Book in the Next Issue.

John F. Banks Joins Rochester (N. Y.) Tel. Co.

JOHN F. BANKS, former traffic superintendent for the New York Telephone Co. at Buffalo, has been appointed district traffic superintendent (city) for the Rochester (N. Y.) Telephone Corp. according to RTC Traffic Superintendent Justin M. Williams.

Banks is a native of Dunkirk, N. Y. and an alumnus of Syracuse University in the class of 1942. After four years in the Army Air Force during World War II, he joined the New York Telephone Co. as a traffic student in Albany in 1946.

In 1947 he was appointed assistant traffic engineer in Albany. He was made district traffic supervisor in Monticello, N. Y. in 1949, moving to Ithaca as traffic supervisor in 1950.

From 1951 to 1953 he was traffic superintendent for the New York Telephone Co. in Rochester, where the New York company provides toll or long-distance telephone service.

Travis Named President, United Tel. Co. of Iowa

UNITED UTILITIES, INC., Kansas City, Mo., has announced the election of L. E. Travis as president and general manager of the United Telephone Co. of Iowa, Newton.

Prior to election as president, Travis had served as vice president and general manager of the Iowa subsidiary. He has 25 years of telephone experience.

John A. Campbell Dies

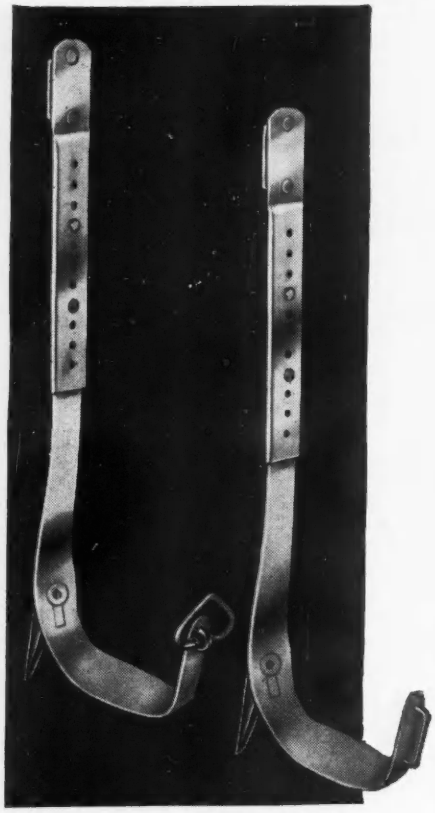
JOHN A. CAMPBELL, 77, retired, died recently in Wheeling (W. Va.) Ohio Valley General Hospital after a heart attack. He had been in the telephone industry for more than 50 years — operating a telephone exchange at Winamac, Ind., and as a telephone salesman at Leich Electric Co. for 25 years. Later he was associated with Automatic Electric Co. and Kellogg Switchboard & Supply Co. Mr. Campbell is survived by his widow, Olive, of Cameron, W. Va., and two daughters, Mrs. Elwood Rhuark, Carrollton, Ohio, and Mrs. Robert Snively of Marietta, Ga.

"Off The Board"

Communications Securities

Markets As Of April 29, 1960	DIVIDEND	BID	ASKED	LAST SALE
American Tel. & Tel.	3.30			88¼
Anglo-Canadian Tel. (Brit. Col. & Dom. Rep.)	1.20	42	45	
Bell Tel. of Canada	2.20			46⅛
British Columbia Tel.	2.20	44	46½	
Calif. Interstate Tel. (Calif., Nev.)	.70	13¼	14½	
Calif. Pac. Util. (Calif., Ore., Nev.)	.90	18¼	19¾	
Calif. Water & Tel.	1.28	26½	28	
Carolina Tel. & Tel.	1.60	38	—	
Central Elec. & Gas (Minn., Ill., Ia., Wis., Va.)	1.00	23¾	25¼	
Central Telephone (Minn., Ia., N. C., Va.)	.88	21	22½	
Chenango & Unadilla Tel. (N. Y.)	1.20	26	28½	
Cincinnati & Suburban Tel.	4.50	89½	92	
Citizens Utilities (Calif., Pa.) "A"	stk. only	13½	14½	
Citizens Utilities (Calif., Pa.) "B"	.52½	12	13	
Commonwealth Tel. Co. (Pa.)	.90	20	21½	
Florida Telephone Co.	1.00	28½	31	
General Telephone & Electronics	2.20			82¾
Hawaiian Telephone Co.	1.00	21½	23	
Indiana Telephone Co.	.50	21½	—	
Inter-County Tel. & Tel. (Fla.)	2.00	68	72	
Inter-Mountain Tel. (Va. & Tenn.)	.80	15¾	17	
Jamestown Telephone (N. Y.)	5.60	82	—	
Lincoln Tel. & Tel. (Neb.)	2.60	63½	—	
Lorain Tel. Co. (Ohio)	1.40	32½	—	
Middle States Tel. Co. (Ill.)	1.00	25	26½	
Mountain States Tel. (Ariz., Colo., Mont., Tex., etc.)	6.60			175¾
New England Tel. & Tel.	1.72	35	37	
North Carolina Tel.	none	1	1¾	
Northern Ohio Tel.	1.60	50	55	
Pacific Tel. & Tel.	1.14			27⅞
Peoples Telephone (Pa.)	4.00	92	—	
Pioneer Tel. Co. (Minn., N. D.)	1.00+stk	36	38	
Rochester Telephone (N. Y.)	1.00			24⅛
Southeastern Tel. (Fla.)	.90	21	23	
Southern New England Tel.	2.20	44	46	
Southern Nevada Tel.	1.00	21½	23	
Southwestern States Tel. (La., Ark., Okla., Tex.)	1.20	24	25	
Telephone Serv. Co. of Ohio "A"	2.80	170	180	
Telephone Serv. Co. of Ohio "B"	2.80	170	—	
Tidewater Telephone Co. (Va.)	1.40	25	—	
United Utilities	1.40	41¼	43	
West Coast Tel. (Wash., Ore., Calif.)	1.20	24¾	26	
Western Union Telegraph	1.40			42¾
Western Utilities	.36	7¾	8½	
Western Light & Tel. (Mo., Ia., Kans.)	2.00	42½	45	

(Source of market — DEAN WITTER & CO.)



No. 1959-AR No. 1958-AR

NEW KLEIN
Replaceable Gaff Adjustable Climbers

These new Klein Replaceable Gaff Climbers assure maximum quality and safety. We recommend leg irons be replaced after three sets of gaffs have been used.

The easily replaceable gaff is held in position by a self-locking screw. Full impact is absorbed by the gaff and leg iron. No load is transmitted to the screw.

Adjustable to 14½, 15, 15½, 16, 16½, 17, 17½, 18, 18½ and 19 inches. Made in matched pairs, right and left. Available with triangular ring at ankle or riveted ankle loop. Aluminum finish. Every climber individually tested.

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Bulletin 559, giving full information on Klein Replaceable Gaff Adjustable Climbers, will be sent on request.

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Ohio Independents Meet at Columbus: Robert D. Gott Elected President

"THE SIXTIES — Decade of Discoveries" was the keynote idea of John T. Naylor, vice president, International Telephone & Telegraph Corp., New York City, when he addressed the 65th Annual Convention of the Ohio Independent Telephone Association at the Deshler-Hilton Hotel, Columbus. The two-day meeting, presided over by James C. Hageman, OITA president, Lorain, attracted more than 600 delegates and guests from Ohio's 91 Independent telephone companies.

Industry and guest speakers discussed a number of timely topics and advanced the convention's theme "A Treasure Chest of Ideas."

Speaking at the first luncheon Naylor told of the great advancements the telephone industry can anticipate during this ten year period.

"As the time and interest dimensions of the world shrink," said Naylor, "telephone communications grow in ascending geoemetrical proportions. Many more high quality submarine cable routes throughout the world are planned. There will be improvements and expansion in tropospheric (over-the-horizon) systems feeding into the domestic toll system. It may be that satellite or moon reflection communications will increase volumes and speed services. Independent telephone company toll terminations, operating practices, and revenues may be affected."

Concerning toll usage per average day, Naylor said it has increased from 5,923,000 per day in 1949 to 9,224,000 calls per day in 1959. In the domestic toll picture for the Sixties, he predicted that the present 15 million telephone users able to dial directly on a nationwide basis will probably increase to 75 million or more by 1970.

"Most of the domestic transmission will be by microwave and carrier — much more service using less and less copper," he said.

Concerning other predictions for the Sixties, Naylor stated "complete residential service" will be commonplace. This will include telephone intercommunication systems between homes, garages, swimming pools and other areas in our diversified modern living arrangements.

During the convention's business sessions, Robert D. Gott, general manager of Wellington Telephone Co., was elected president for the 1960-61 term, succeeding Hageman. Elected to the vice presidency was Howard C. Slusher, president, Commonwealth Telephone Co., Athens. Daniel W. DeHayes, Columbus, was re-elected to the post of executive vice president and secretary-treasurer, a position he had held since 1953.

Re-elected to the OITA Board of Directors were William C. Henry, Northern Ohio Telephone Co., Bellevue; Ralph F. Mateer, Warren Telephone Co.; Raymond J. Maxwell, Mansfield Telephone Co.; J. Warren Safford, Troy-Tipp Telephone, Inc.; R. R. Waltz, Delta Home Telephone Co.; and Howard Wright, Ashtabula Telephone Co.

At the Tuesday afternoon business meeting, Richard S. Zachman, public relations information supervisor of the General Telephone Co. of Ohio, Marion, unveiled the association's "Community Development Kit."

The kit, entitled "Ohio Communities on the Grow," is a working portfolio of ideas especially designed for use in communities of 5,000 population or under, to develop bigger and better communities in areas served by Independent telephone companies. Specifically, it contains a Survey of Community Resources, 21 questions to be used by citizens in studying their own local conditions. After the survey has been made in a community and its citizens know where to expend their efforts, a complete organizational Plan of Action for a Better Community, contained in the kit, will assist them in setting up definite goals and committees to put their plan effectively into action.

Wednesday morning started out on a bright note with an "early bird"

Pioneer breakfast for the Buckeye State Chapter, Independent Telephone Pioneer Association. Elected as 1960-61 Chapter officers were Mrs. William Dutch, Elyria Telephone Co., president; H. M. DeGroff, Troy-Tipp Telephone, Inc., vice president; and R. W. Sheldon, Commonwealth Telephone Co., Athens, secretary-treasurer. Entertainment was provided by the "Dogpatchers," a novelty quintet of Ohio Fuel Gas Company employes, Columbus.

At the Wednesday morning business meeting, Foster B. McHenry, president of the United States Independent Telephone Association, Jefferson City, Mo., in his address, "The Golden Decade Is Here," said that "Our business is experiencing a tremendous rate of growth. In fact, it is reported that this growth rate is presently running ahead of the Bell System!"

McHenry stated that 54% of the world's telephones (125 million) are located in the U. S.

"This is reason enough for optimism," he said. "The brightest years and largest opportunities lie ahead, because it is estimated that by 1980, there will be 77 million more people in the United States."

If the Independent companies are to prove equal to the coming opportunities, McHenry stated they must recruit a greater number of young people, have more technical trainees to cope with new and unknown problems, establish higher trainee standards for executives, management, and supervisory positions, attract more investors who will demand competitive returns on their investments, and obtain higher earnings than presently allowed by regulatory commissions.

Following McHenry's address Daniel W. DeHayes, executive vice president and secretary-treasurer of OITA, spoke on the subject "Living with Our State Governmental Problems." The final speaker of the morning's business session was Gordon Gardner, *Columbus Citizen-Journal* and *Columbus Dispatch*, speaking on "Improving Your Newspaper Advertising." With Ohio Independent telephone companies' advertisements as background material for his presentation, Gardner suggested practical ways to increase the effectiveness of our present advertising programs.

At the Wednesday luncheon session, awards were presented to various companies based on their programs of outstanding community relations, and employe safety. Additional awards were presented to individuals having outstanding past service records in the industry.

Presenting the Community Service Awards was Robert D. Gott, OITA vice-president, Wellington. The recipients included Elyria Telephone Co.; General Telephone Co. of Ohio, Marion; Lorain Telephone Co.; Northern Ohio Telephone Co., Bellevue; and Western Reserve Telephone Co., Hudson.

Past Service Awards, an innovation at this year's convention, were given to those individuals who have spent 50 years or more in the telephone industry, and who, during that period, have acted as an OITA officer, director, or have served on an association committee. Presenting these awards was Foster B. McHenry, president of the United States Independent Telephone Association.

Accepting their Past Service Awards were: J. D. Bonnar, Ashtabula Telephone Co., 59 years; J. D. Park, Kenton Telephone Co., 60 years; Herman E. Hageman, Lorain Telephone Co., 60 years; and J. Warren Safford, Troy-Tipp Telephone Co., Troy, 55 years.

The Safety Awards, which were presented by J. Maynard Dickerson, chairman, Industrial Commission of Ohio, Columbus, were divided into two categories of seven groups each. The first category of Safety Awards was presented in a group classification to organizations having the best safety record based on the number of man hours of labor exposed to accident. The winners were General Telephone Co. of Ohio, Marion; Lorain Telephone Co.; Ashtabula Telephone Co.; Champaign Telephone Co., Urbana; Kingsville Telephone Co.; Vanlue Mutual Telephone Co.; and Ottoville Mutual Telephone Co.

The 100% Awards were presented to companies that had no acciden's during 1959. This distinguished

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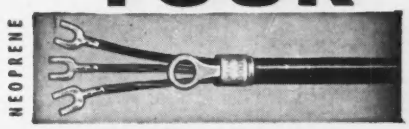
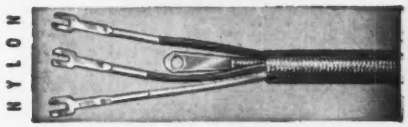
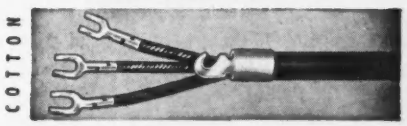
YOUR



BEST



BUY!



Are you familiar with the features of these fine cords?

NEOPRENE covered cords are a highly serviceable cord, extensively used in a wide variety of services. They are moisture and grease proof . . . easy to keep clean.

NYLON covered cords are a relatively new development in telephone cords. Their fine smooth texture makes them the preferred cords for switchboard use. They give long service. Preferred by operators because of their fast, easy handling.

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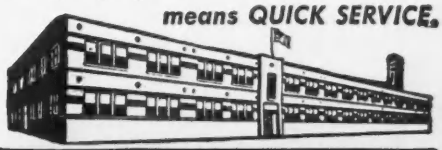
Take your choice—Neoprene, Nylon or Cotton. They're all high quality cords made in accordance with Runzel high standard of quality. We carry a large stock of cords for every purpose.

Our geographical location means QUICK SERVICE.



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HTL-195
EXTRA HIGH-TENSILE TELEPHONE LINE WIRE
for low-cost Rural Lines

• Spans up to 600 feet in Heavy Loading, 650 feet in Medium Loading and 700 feet in Light Loading districts are possible where Crapo HTL-195 is employed. This extra long span construction results in marked savings in costs per mile of line. Pole structures can be reduced to a minimum. Fewer pole structures mean substantial savings both in materials and man-hours of labor. There is less hauling to be done, fewer holes to dig, less material to be handled, installed and connected.

Improved electrical qualities make practical typical subscriber loops of 14 to 15 miles with normal voltages and equipment. Also can be used for subscriber carrier.

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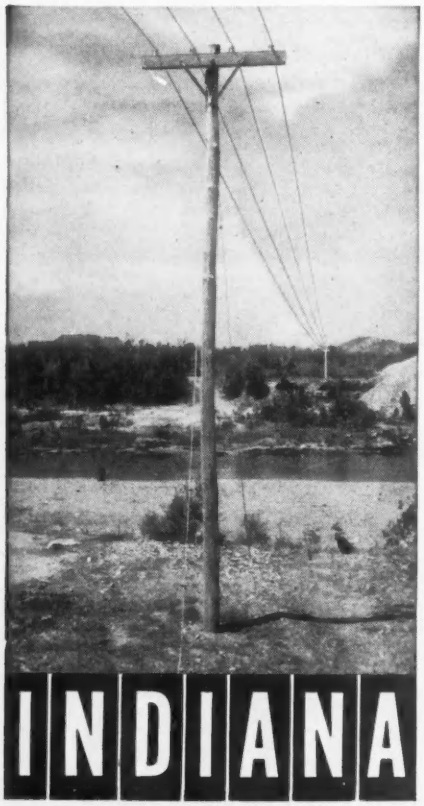

INDIANA
STEEL & WIRE CO., INC.
MUNCIE, INDIANA

group included Lorain Telephone Co.; Elyria Telephone Co.; Ashtabula Telephone Co.; Champaign Telephone Co., Urbana; Wellington Telephone Co.; Conneaut Telephone Co.; Community Telephone Co., Leipsic; Orwell Telephone Co.; Continental Telephone Co.; Delta Home Telephone Co.; Columbus Grove Telephone Co.; Harlan Telephone Co., Pleasant Plain; Kingsville Telephone Co., Dorset; Citizens Mutual Telephone Co., McClure; Fayetteville Telephone Co.; Centerville Telephone Co., Belmont; Vanlue Mutual Telephone Co.; Farmers Mutual Telephone Co., Okolona; Ottoville Mutual Telephone Co.; Nova Telephone Co.; Bascom Mutual Telephone Co.; Chatham Farmers Mutual Telephone Co., Medina; and New Bavaria Telephone Co.

Highly honored at the Awards Luncheon was Kenneth J. Pontius, an installer for the Western Reserve Telephone Co., Hudson, who won the "Beyond the Call Award" for his heroism in saving the lives of two residents of Twinsburg, Ohio.

Featured speaker at the Awards Luncheon was Dr. Glenn E. Clayton, president of Ashland College, Ashland, Ohio. Speaking on the subject, "Dynamic Leadership," Dr. Clayton said that "in the midst of this great delegation, surrounded by an eloquent example of the progress of men of ideas, let us take courage as we look ahead. Our one basic problem is to use every resource at our command to assure the freedom of man to think clearly today, as he had learned to do in the past."

Following the luncheon, delegates attended panel discussions in four Trading Posts of Ideas covering the fields of accounting, commercial-public relations, plant-equipment and traffic. After the various presentations, delegates submitted their questions for discussions.

Participants in the panels and their topics were: *Accounting Trading Post of Ideas* — Moderator, W. H. Todd, Northern Ohio Telephone Co., Bellevue, with Edward E. Knaub, chief accounting department, Public Utilities Commission of Ohio, Columbus; R. E. Haan, sales manager,

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NATCO CLAY CONDUIT provides permanent, low cost protection for Underground Telephone Cables. Available in a full line of shapes.

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327 Fifth Ave., Pittsburgh 22, Pa.

NOW! On-Off Control Always at Your Fingertips *with the...*

SUPER jiffy®
SOLDERING and BRAZING TORCH

As mentioned in **"Plant Notes on New Developments" (Feb. 15, 1960).** An ideal air-acetylene torch for telephone cable repair. A No. 3 tip is recommended for most work. Tip is always in working position when seated. Write for literature.

MODERN ENGINEERING CO., INC.
Meco
3411 PINE BLVD., ST. LOUIS 3, MO.

Service Bureau Corp., Cleveland; William G. Barth, vice president, Cincinnati & Suburban Bell Telephone Co., Cincinnati.

Commercial-Public Relations Trading Post of Ideas — Moderator, George Knapic, commercial superintendent, Warren Telephone Co., with E. B. Voelcker, general directory supervisor, Ohio Bell Telephone Co., Cleveland; Nap Videan, directory supervisor, Northern Ohio Telephone Co., Bellevue; James G. Smith, executive vice president, Hameroff & Smith, Inc., Advertising, Columbus; Marvin Johnston, commercial manager, General Telephone Co. of Ohio.

Plant-Equipment Trading Post of Ideas — Moderator, Fred Gerber, plant superintendent, Lorain Telephone Co., with John S. Belcher, circuit design & development engineer, Leich Electric Co., Chicago; Marion S. Emrich, staff superintendent cable maintenance, Ohio Bell Telephone Co., Columbus; Ross H. Herrick, chief engineer, Lorain Telephone Co.; John G. Beckley, manager, Electronic Sales, Buckeye Telephone & Supply Co., Columbus.

Traffic Trading Post of Ideas — Moderator — Mrs. Florence Gaskalla, chief operator, Elyria Telephone Co., with Charles Murray, traffic manager, Lorain Telephone Co.; Mrs. Emma Lou Geus, personnel manager, Midland Mutual Life Insurance Co., Columbus; Frank W. Donahue, traffic engineer-planning, Ohio Bell Telephone Co., Cleveland.

Texas Independents Hold 55th Annual Convention

THE 55th annual convention of the Texas Telephone Association lived up to its advance billing as "The big meeting of 1960," and those attending the 3-day meeting at the Baker Hotel, Dallas, described it as the state's top convention.

According to the association's executive secretary, Jack Haley, "Even our Sunday starting was a busy one, for many came to register early and to attend the meeting for the Commercial Borrowers of the REA conducted by the committee headed up by Dee Cole."

Among the speakers at the REA

For the BEST
in pole values
specify
P&H
FULL LENGTH TREATED
P&H
PENTA
NORTHERN WHITE CEDAR POLES
Durable
Strong
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When you specify reliable P & H Penta Poles you *know* your investment is sound, your aerial plant is safe for many years of dependable, trouble-free service. Overhead construction with P & H Penta Poles has been field tested and proved through more than 50 years of participation in telephony progress.
PAGE & HILL, INC.
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meeting were: Ed Maddox, assistant in REA's Loans & Operations Department; Douglas Gleason, secretary of Kansas Telephone Association and executive secretary of the REA Commercial Borrowers Association; and W. G. Winters, Houston, member of the REA Advisory Committee.

At the first general session, Allan R. Stacey, vice president and manager of the Sunland-Tujunga Telephone Co., Sunland, Calif., discussed "The Case of the Ossified Ostrich." Stacey is chairman of the USITA Marketing Committee and is the author of TE&M's "Commercial Department Notes."

Marion A. Clay, first vice president of the association, presided at the Monday afternoon session which featured two departmental discussions — Plant and Traffic.

Ken Madry of Brownwood, as chairman of the Plant Committee, introduced E. B. Wheeler, outside plant engineer of Southwestern Bell, Dallas. Wheeler discussed "Buried Plant, Wire and Cable."

The Traffic discussion, directed by N. T. "Rusty" Dunlap of the Southwestern Bell and his committee, featured presentations by Lera J. Johnson of Sherman and Winnie B. Burnett of Brownwood.

Committee reports were presented at the general session on Tuesday morning.

The following directors were reelected: Morris S. Burton, Tyler; J. T. Chambers, Tenaha; Cliff R. Dowd, Hawkins; Claud H. Gilmer, Rocksprings; Charles Hendrix, Brazoria; and Guy Smelser, Bogata. Pam D. Grinstead of Kerrville Telephone Co. was elected for his first term on the board. Oscar Burton, whose term expires in 1962, had requested that his status revert to director ex officio. J. T. Ricketts of Western Telephone Service, Vega, was elected to fill the unexpired term.

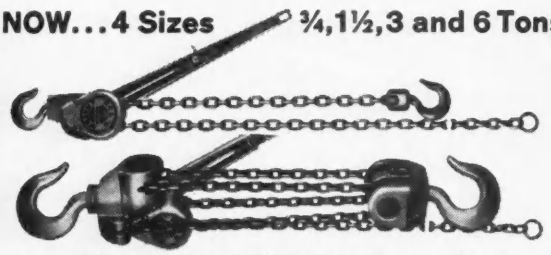
Foster B. McHenry, president of the United States Independent Telephone Association and president of the Capital City Telephone Co., Jefferson City, Mo., addressed the Tuesday morning session. He urged companies, throughout the country, to keep an eye on the Washington scene this year and an ear to the ground on legislation affecting the telephone industry.

The Tuesday morning session also featured a panel discussion on "Making Mark Sense Make Sense." Members of the discussion group were: Coordinator Joe H. Collyns, public relations assistant, General Telephone Co. of the S.W.; N. T. Dunlap, traffic supervisor, Southwestern Bell; Mert Steiner, revenue accounting methods and results supervisor, Southwestern Bell; Winnie B. Burnett, traveling chief operator, Southwestern States Telephone Co.; Jack Rutland, auditor receipts, Southwestern States Telephone Co.; Gerald Bettes, commercial practice and project engineer, General Telephone Co. of the S.W.; Oscar Weisz, manual equipment engineer, General Telephone Co. of the S. W.

The Tuesday afternoon session, presided over by Marion Clay, fea-

New ¾-ton Type "C" Pull-A-Way

NOW... 4 Sizes ¾, 1½, 3 and 6 Tons



WRIGHT Type "C" Pull-A-Ways make easy work of hundreds of quick hook-up jobs. Now available in four sizes—¾, 1½, 3 and 6 ton—Type "C" Pull-A-Ways are portable, safe and rugged. Corrosion-resistant modern aluminum alloy castings are used for gear case, handle and covers of all models. Hooks, load chain and chain sheave are made of alloy steel. Positive, dependable load brake securely holds load at any point. Lubricated for life. Weights: ¾-ton, 14 lbs; 1½-ton, 23½ lbs; 3-ton, 36½ lbs; 6-ton, 63 lbs.

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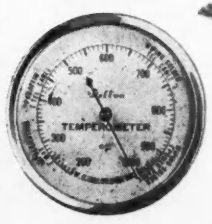
York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

IT'S TRUE

Accurate temperature measurement of wiping solder, impregnation wax, paraffin, etc. IS an absolute must if porous cable joints are to be avoided! An inexpensive Dillon Temperometer reveals exact pot temperature at a glance. Dial is marked with recommended points for various compounds.

Stainless steel construction outlasts ordinary glass thermometers many times over. Has 8¾" stem length, 2⅜" dial diameter. Reads from 200° to 1000° Fah. Comes with handle. Countless thousands in use by leading telephone and utility companies, also by U.S. Signal Corps. Shipment by parcel post from stock or may be ordered from leading jobbers. Write for illustrated bulletin. No obligation.



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tured two departmental discussions: Accounting and Commercial.

The subject "Accounting Problems for Small Companies" was discussed by E. Vogelsang, REA field accountant.

During the Commercial Committee presentation, Roy Priest of General Telephone Co. of the Southwest, in discussing "Don't Let It Go Down the Drain," stressed loose collection practices that should be avoided.

The Texas Chapter of the Independent Telephone Pioneer Association elected the following officers: President Dee Cole, Greenville; First Vice President J. L. Kemper, Brownfield; Vice Presidents H. L. Housley, Dallas, Morris Bateman, Conroe, and Art Anderson, Stephenville; and Secretary-Treasurer Wallace H. Johnson, Dallas. The directors are Winnie B. Burnett, Brownwood; F. A. Robinette, Seymour; Guy Smelser, Bogata; B. Simmons, West Columbia, and W. T. Reichel, Killeen.

The newly elected officers of the Texas association are: President Marion A. Clay, Lufkin; First Vice President W. S. Bain, San Antonio; Second Vice President H. Y. Price, Jr., San Marcos; Treasurer Pam D. Grinstead, Kerrville; and Executive Secretary J. B. Haley, Austin.

Harold Thompson Heads Iowa Independent Assoc.

THE 1960's will constitute the golden decade for the telephone industry, Foster B. McHenry of Jefferson City, Mo., president of the United States Independent Telephone Association, said last month.

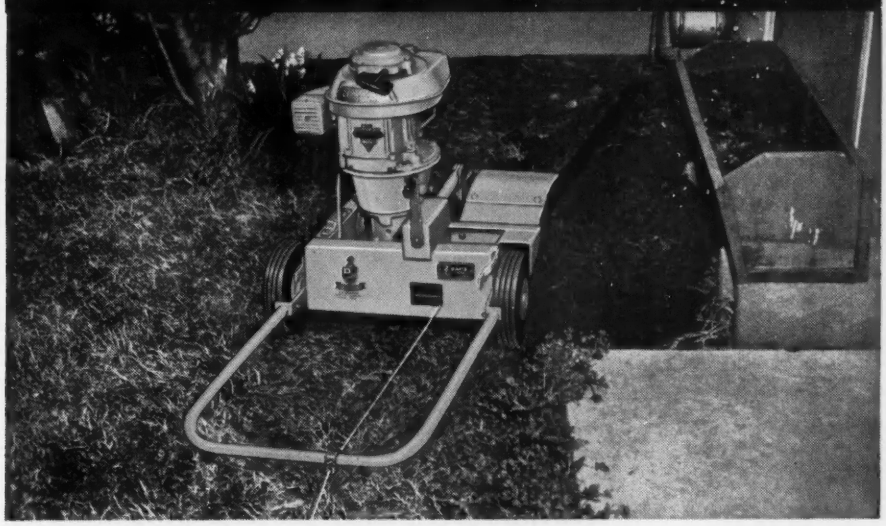
McHenry, speaking before the convention of the Iowa Independent Telephone Association at Hotel Fort Des Moines, said population growth in the United States, which has 54% of the world's telephones, will bring opportunities and obligations.

"The decade on which we are embarking will require more stations, more plant facilities, more money for investment purposes and many more technical advances," McHenry said.

The telephone systems will have to have more young recruits and technical trainees, higher standards, more earnings and more investors, he said.

Orla Moody, staff coordinator of

the DAVIS PUP TRENCHER
IS POSITIVELY SELF-PROPELLED



trenches while you do other work!

The portable, self-propelled Davis Pup Trencher has proven itself as the most valuable trenching tool available for assignments from 2" to 3" wide to 36" deep or 4" wide to 18" deep. Users have reported it has paid for itself on the very first job.

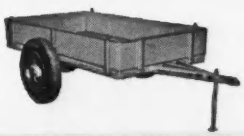
It is positively driven by a simple, six-speed winch mechanism that pulls it down the line you want dug. Since it doesn't require constant supervision, you are free to take care of other work on the job — such as prepare pipe or cable for the trench. It disturbs a minimum of turf so backfilling is easy.

The Davis Pup has quality features throughout, but it is still priced less than comparable trenchers. Compare it for performance, quality, and price. See if you don't agree that pound for pound, dollar for dollar, it's your best trenching buy!

and if you need to go larger — the NEW DAVIS T-66 fills the bill!

This amazing trencher features positive traction, hydraulic variable speed drive, accurate speed control, hydraulic boom control, preloaded shock absorbing boom, and convenient — virtually effortless — operation. Digs 3" to 4" wide to 66" deep or 12" wide, 30" deep and varying depths and widths in between. Compact design with 1350 lbs. total weight; only 37" wide. Has well-designed backfill blade attachment, two-speed drive with instant forward or reverse, and many other features. Ask about its 90-day unconditional guarantee!

the PERFECT VEHICLE FOR TRANSPORTING TRENCHERS AND SUPPLIES



THE DAVIS HUSTLER

This 2000-lb. capacity utility trailer was especially designed for the T-66, but it has a wide range of uses. Deck is 48" x 84". It has a low center of gravity and provides load equalization regardless of load distribution.

DAVIS MFG. INC.
1514 South McLean Blvd., Wichita 13, Kansas

Please send me literature and tell me the name of the distributor for the Davis Pup_____Davis T-66_____Davis Hustler Utility Trailer_____

NAME _____

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TOWN _____ STATE _____

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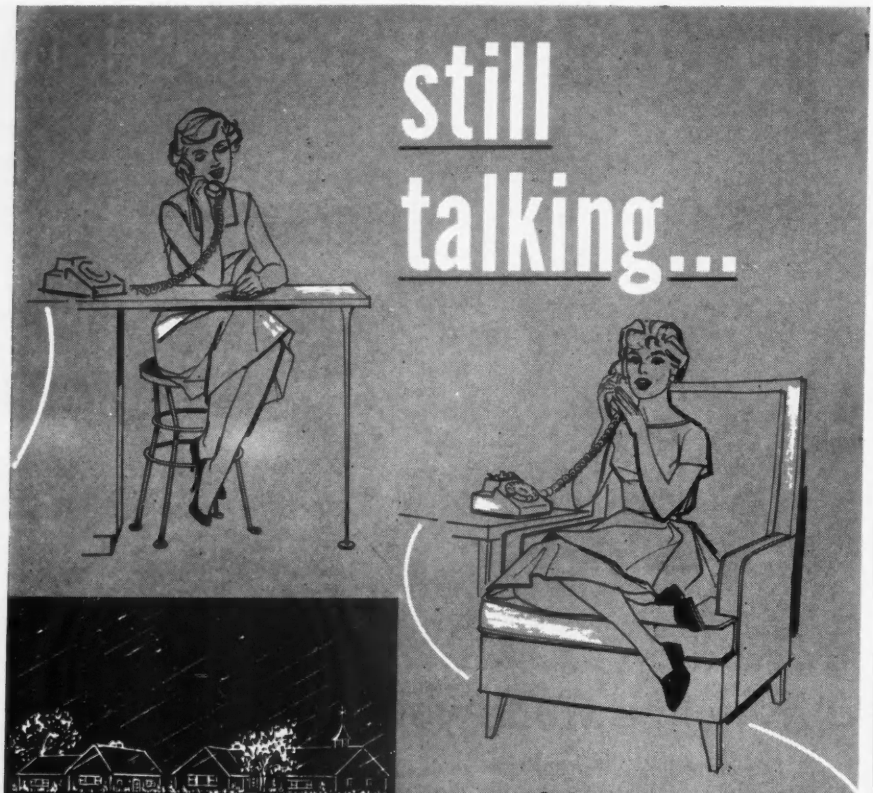

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PUREGAS Air Dryers protect your cables through even the most adverse conditions. Pressurized dry air is pumped through the air space within your cables preventing moisture from attacking the paper insulation and shorting your circuits.

Now, with PUREGAS Systems on guard you can take care of emergency repairs on a *routine schedule.* No need to send emergency crews out late at night or during storm conditions to restore service. Maintenance can be safely scheduled to your convenience without worry of possible internal water damage to cables during the night.

To find out how you can take advantage of a PUREGAS Program – send for descriptive literature

- "Why Cables Should be Pressurized"
- Data Sheets on Model 750, 1500 and 5000 Air Dryers
- Cost Comparison—Air Dryers vs. Nitrogen

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PUREGAS EQUIPMENT CORP.

578 Oak Street, Copiague, L. I., N. Y.

Bell-Independent operations of the American Telephone & Telegraph Co., New York City, told the Iowa group some big companies are setting up their own long-distance telephone systems and it's a threat to the telephone industry.

The way to meet the threat is to be more competitive and give the customer what he wants, said Moody.

The help that better communication facilities can give farmers, and the need to educate farmers to that fact, was stressed to the Iowa Independents by Parker Sullivan, vice president, marketing & sales, General Telephone & Electronics Corp.

Discussing an extensive marketing test his company has been making in a five-state Midwest area, Sullivan said the test disclosed that most farmers have a need for a central loud signal (a bell or a horn) outdoors in the vicinity of the house, barn and sheds.

Sullivan said the average farmer doesn't realize the additional services, such as an outside bell, are available.

Harold Thompson, of Clear Lake, was elected president of the Iowa Independent Telephone Association. Also elected were A. W. Sanders, New London, first vice president; E. B. Zerwas, Manning, second vice president, and William F. Miller, Des Moines, executive secretary.

Elected to the board of directors were Howard Amick, Des Moines; Earle G. Bellamy, Knoxville; Roy E. Brandel, Mt. Pleasant; Edward G. Carlson, Creston; Gene Daubendieck, Jefferson; W. E. Fowler, Pella; Arthur E. Long, Sloan; Clyde McFarlin, Montezuma; John J. McIntosh, Cedar Rapids; H. Filmore Melick, West Liberty; Harry Miller, Great Bend, Kans.; W. F. Miller, Des Moines; C. C. Pearce, Riceville; V. D. Peck, Primghar; A. W. Sanders, New London; Harold Thompson, Clear Lake; L. E. Travis, Newton; J. L. Trevillion, Chariton; Joseph L. Van Horn, Grinnell; Ross K. Vernon, Sioux Center; Kenneth A. Young, Ft. Dodge; and E. B. Zerwas, Manning. Honorary directors are Henry B. Melick, West Liberty; and Lloyd F. Morrison, Grinnell.

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Largest Circulation Serving The Telephone Industry

HELP WANTED

CABLE SPLICERS, Station Installers, Equipment Installers, Linemen. Experienced men needed. Steady work, good pay. Henkels & McCoy, 1800 Johnson Street, Elkhart, Indiana, or 6100 N. 20th St., Philadelphia, Pa.

OUTSIDE PLANT ENGINEER — An expanding telephone company located in Florida has immediate opening for an experienced outside plant engineer with administrative ability. Must be thoroughly experienced in transmission, cable loading and be able to direct and train personnel. Salary commensurate with experience and qualifications. Replies confidential. Send resume and photograph to Box 104, c/o TE&M, 7720 N. Sheridan Road, Chicago 26, Illinois.

SWITCHMAN — Must be fully qualified to maintain step equipment. Good wages and opportunities for advancement with rapidly growing telephone company. Reply sending complete resume to C.O.E. Supervisor, Box 705, Ft. Walton Beach, Florida.

PLANT & CENTRAL OFFICE REPAIRMAN — for progressive California telephone company. Pension, health, and life insurance plan. Send resume of qualifications and photo to Box 106, c/o TE&M, 7720 N. Sheridan Rd., Chicago, Illinois.

MUNICIPALLY owned telephone system, serving 19,000 telephones, needs Telephone Department Superintendent. This is a top position in telephone field. It requires man who has had wide experience in management of private telephone systems, has knowledge of procedures and experience with modern electronic switching equipment. Position has excellent growth possibilities. Starting salary will range from $13,500 to $14,000 per year, will increase to $16,000. Please send your resume of personal, educational and experience qualifications to Box 117, c/o Telephone Engineer & Management, 7720 N. Sheridan Rd., Chicago, Ill.

AMBITIOUS MEN — Qualified as station installers, equipment installers, cable splicers, linemen. Work in midwest. Harris-McBurney Co., Inc., P. O. Box 267, Jackson, Michigan.

WANTED: Communication Engineers, Tel. Equipment Engineers, Tel. Circuit Designers, Tel. Traffic Engineers, Tel. Transmission Engineers, Senior RR Communication Engineers. Many top positions open for retired Communication Engineers. Local and out of town assignments. Top pay and per diem. Send resume or call D. J. Kay, HEmpsted 9-1386, Kay & Associates, 1605 Palm Drive, Mt. Prospect, Illinois.

SITUATION WANTED

TELEPHONE ENGINEER — desires position with progressive Independent telephone company. Excellent references. Write Box 115, TE&M, 7720 N. Sheridan Road, Chicago 26, Ill.

WOULD YOU LIKE TO LIVE— AND WORK—IN **HAWAII?**

We need qualified communications engineers for career placement now

Hawaiian Telephone Co. is rated among the top ten Indedendent telephone companies of America. We are more than 75 years young. To meet the communications challenge emphasized by Statehood, we must accelerate our growth. To do this we need additional permanent employes qualified in both radio and telephone engineering. If you're interested in a telephone career, and don't mind pursuing it in "paradise", air mail complete resume and a photo of yourself to:

Employment Supervisor, Hawaiian Telephone Co.
P. O. Box 2200
Honolulu, Hawaii

***When written resumes are screened, personal interviews will be arranged with qualified applicants.* All applications will be held in strictest confidence.**

HAWAIIAN TELEPHONE CO.

COMMUNICATION ENGINEER

Los Angeles company has permanent position involving responsibility for designing, establishing, and maintaining integrated communication system. Should have an electrical engineering degree with a major in communications. Five to seven years experience in the telephone industry. Mobile radio experience desirable. Salary commensurate with ability and experience.

CONTACT CARL PHILIPP AT RICHMOND 8-3111

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2601 S. Figuerosa, Los Angeles, Calif.

Send your ad to "Telephone Market Place," TELEPHONE ENGINEER & MANAGEMENT, 7720 N. Sheridan Rd., Chicago 26, Ill. Or call ROgers Park, 4-3040, Chicago, Ill.

FOR SALE

MAGNETO TELEPHONES — Leich 901 wall or desk magneto telephones. Cleaned, tested and guaranteed, $16.50 each. As removed from service $15.00 each. Turtle Lake Tel. Co., Turtle Lake, Wisc.

RECLAIMED SLIGHTLY USED WIRE

DISTRIBUTION — 6-pair #19 Copper solid, Color Coded. With heavy support wire, 300 or more feet per run, — Few splices per coil @ 7 cents per foot.

DISTRIBUTION, SAME AS ABOVE, (BLACK. NOT COLOR CODED) @ $55.00 per M. ft.

DROP WIRE. NEOPRENE, COPPER WELD CONDUCTORS, 90 or more Feet per run. Each run separate coiled, @ $11.00 Per M. Ft.

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INDEPENDENT TELEPHONE REPAIR CO.
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LAfayette 3-5439

TELEPHONE MARKET PLACE

(Continued from page 93)

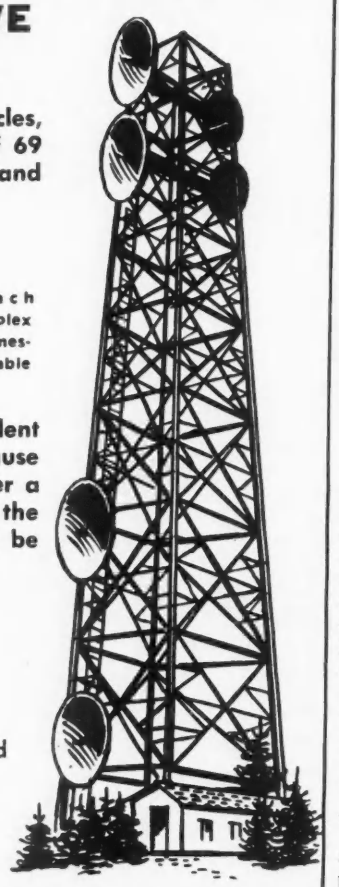
For Sale MICROWAVE SYSTEM

Pulse Time Modulated 2000 Mega Cycles, Federal Electric make, with a capacity of 69 voice circuits. Can be used for telegraph and teletype as well.

The System consists of:

1. 5 complete repeater stations for a 3 path system. Two repeaters are equipped for triple diversity reception.
2. Terminal stations each equipped with 2 multiplex units. A total of 23 message circuits are available on each multiplex.

This is a working system giving excellent service and is only being replaced because of the need for additional capacity over a very high usage route as a part of the Trans-Canada Telephone System. Will be sold on an "as is" "where is" basis.



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#17-2	2.00
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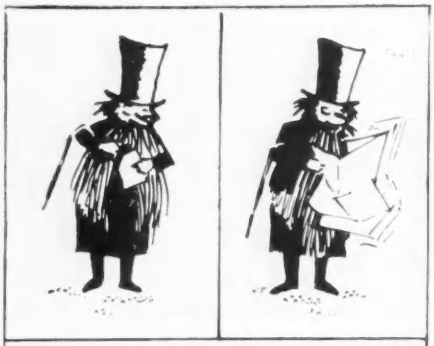

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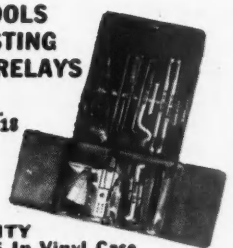

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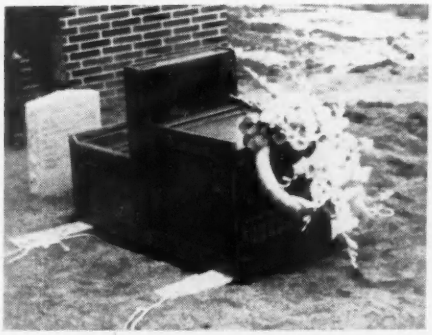
News and views of Independent telephone people VOLUME 9, NO. 2 • MAY, 1960

Telephone men "bury" switchboard, end magneto era, at Milan, Ga.



Georgia's last magneto switchboard just before "the end."

In memoriam

H. C. Hearn, Jr., owner of the Dixie Telephone Company, right, and W. H. Parrish, Stromberg-Carlson installer, prepare the switchboard for "burial."

"This is one funeral at which there will be no mourners."

So stated C. J. Mathews at the recent "burial" of Georgia's last operating magneto switchboard. Mr. Mathews is president of the Georgia Telephone Association.

Among those present to witness the ceremonies and the XY® Dial cutover at Milan, Georgia, were REA administrator David A. Hamil of Washington, D. C.; and John S. Seigle, Georgia vice-president and general manager for Southern Bell Telephone Company. H. C. Hearn, Jr., owner of the Dixie Telephone Company, was host for the occasion.

Mr. Mathews cited the fact that the event ended the era of the magneto exchange in Georgia. He pointed out that the old magneto instrument has had an important place in Georgia's telephone story, but it is outmoded by the smaller, more efficient instruments which provide a modern, dependable communications service.

The 200-line XY Dial system at Milan will serve subscribers in the South Central Georgia area. The Dixie Telephone Company, through the cooperation of the REA, already operates a group of XY Dial exchanges in that region.

After the ceremony, an open house and dinner were held. Mr. Hamil and Mr. R. B. Alford of the Georgia Public Service Commission addressed the dinner group and congratulated the people of Georgia for the continuing progress in telephony.

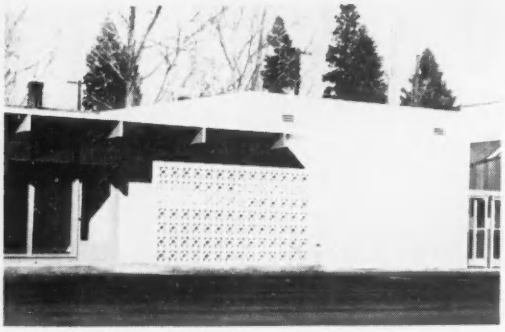
REA administrator David A. Hamil tosses first shovelful of dirt on obsolete magneto board at Milan, Georgia. Through the joint effort of the REA and progressive Independents, Georgia has fully entered a new era in telephony.

Safety hits new high

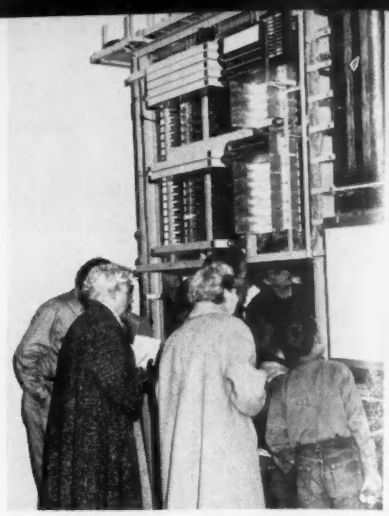
"Safety and quality go hand-in-hand."

This was Leo Miller, safety manager, announcing the Stromberg-Carlson employee record of four million man-hours without a lost time accident. The Telecommunication Division accounted for half of those hours.

"We must be constantly on guard to see that safety is controlled just as closely as quality," Mr. Miller stated. "This requires a great effort. Our new record indicates that the employees are making that effort."



Modern exchange building at Westwood, Calif., symbolizes the West's progress.



Guests stand fascinated by the smooth-working XY Dial equipment at Westwood open house.

A forward-looking team: E. J. Macario, California Public Utilities Commission; Earl Hansen, district manager, and Harold Bright, telephone engineer, both of California-Pacific Utilities; M. W. Edwards, Public Utilities Commission; and Ken Kelly, Stromberg-Carlson sales engineer.

Two more service

Everybody likes to see growth in his town, county or state. But when you serve three states in the fastest growing area of our country, well, that can present problems.

Mr. E. K. Albert, president of the California-Pacific Utilities Company, faces that situation. His solution is a practical one. He's meeting present demands while providing for future expansion.

California-Pacific Utilities is based in San Francisco and supplies electric power, gas, water and telephone service to the exploding West. It operates exchanges in California, Oregon and Nevada. Harold C. Bright is telephone engineer and V. V. Lyman, purchasing agent.

Because the West is growing so rapidly, the company decided on a dial system that could grow with the area and yet provide top quality service immediately. California-Pacific Utilities recently cut over its eighth and ninth XY Dial exchanges.

Nearly 12,000 subscribers are served by the company — 85% by XY Dial. The latest conversions were at Westwood, California, and Lamoille, Nevada.

Westwood manager Donald Heard explains the simple dialing procedure to an interested family at open house prior to the conversion.

Success of Westwood cutover was particularly satisfying to Stromberg-Carlson installer foreman, Herb Ollig, his wife and daughter.

Attending ground-breaking ceremony for Westwood exchange building were, from the left, Earl Hansen, division mgr., California-Pacific Utilities; John Bradley, president Westwood area Chamber of Commerce; R. J. Langford, asst. division mgr., California-Pacific Utilities; Paul Bofetti, City of Westwood property manager; William Tunison, Sr., Lassen County supervisor; Clement Doyle, president Lassen County Chamber of Commerce; Harry Dorman, contractor; Harold Bright, telephone engineer, California-Pacific Utilities; Donald Heard, Westwood manager.

The ladies want to know all about how the "mechanical operators" work.

Memories of other exciting days at Lamoille, Nevada. The troops encamp at Fort Halleck, established by the government in 1867.

XY® Dial offices placed in by California-Pacific Utilities

Both Westwood and Lamoille offer summer relaxation to the simmering city-dweller. Snow-capped mountains, busy brooks and tall timber blend into a cooling composure that makes weather reports almost unnecessary.

The two exchanges are 290 miles apart, but the telephone service is identical. Residents of another California community, Arbuckle, will soon be enjoying that same fine service, as XY Dial is installed by California-Pacific Utilities later this year. Here is another example of the West progressing, and a company that's matching it, stride for stride.

Extending a cool invitation to summer visitors are the statuesque Ruby Mountains near Lamoille.
Photo by Mell Steninger

Energetic owner quickly brings XY Dial to Hanska, Minnesota

Just 14 months after purchasing the former Hanska Rural Telephone Company of Hanska, Minnesota, owner-manager Wesley Hanson was serving his customers with XY Dial.

Those 14 months were busy ones. A new exchange building was constructed. All rural lines, a total of 150 miles, were rebuilt with new wire and poles.

Mr. Hanson's work paid off quickly for his company — now called the Viking Telephone Company. Improved service has already brought a 25% increase in stations. A new bank and bowling alley, now under construction, and a central school, soon to be built, are good indications of what future growth will be.

The Viking Telephone Company serves a 250-square-mile area in southern Minnesota. This includes the towns of La Salle and Godahl, as well as Hanska. The region is rich in fertile farm land and many residents make their living from the soil. Others journey to neighboring New Ulm where a Kraft plant and other factories provide employment.

The refreshing waters of nearby Lake Hanska bring delight to hundreds of summer visitors. A touch of the past is provided by Ford Hill, site of a famous Indian battle.

The company is a family affair, with Mrs. Hanson doing her share as bookkeeper and commercial manager. Mr. Hanson finds his past telephone experience helpful in his present role of owner-manager. He formerly worked on REA construction in South Dakota. After six years as a plant supervisor in another exchange, he took over as manager at Hanska in 1957. He recently returned from Stromberg-Carlson's XY Dial school at Rochester, N. Y.

The Hanska exchange is in the center of a progressive Independent territory. Companies at St. James, Madelia, New Ulm and Sleepy Eye, Minn., all in the Hanska area, are serving subscribers with XY Dial.

Left — Mrs. Vincent Ringnell, Hanska mayor, places first long distance call after cutover. Looking on is V. C. Burchett, Stromberg-Carlson sales representative.

Above — Wesley Hanson, owner-mgr. of Viking Telephone Company, makes final check on XY equipment prior to cutover.

Warren French, Jr., of Edinburg, Va.

Davis, West Virginia, busy headquarters of both Duncan Telephone Co. and United Utilities of West Virginia.

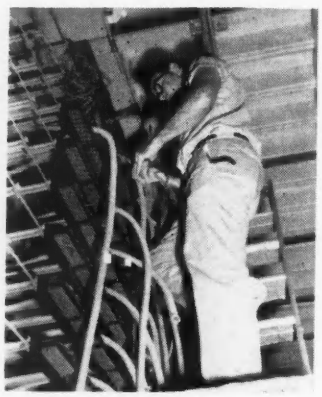
"The valley is a th

So they say in West Virginia, particularly in the Canaan (pronounced Ca-nayne') Valley. You come up steeply from any direction; at the top you're in the "valley" and here is Davis — called the highest incorporated town east of the Rockies, containing the hauntingly beautiful Blackwater Falls Park, and headquarters for two telephone companies that have exploded into prominence. But this is to start in the middle.

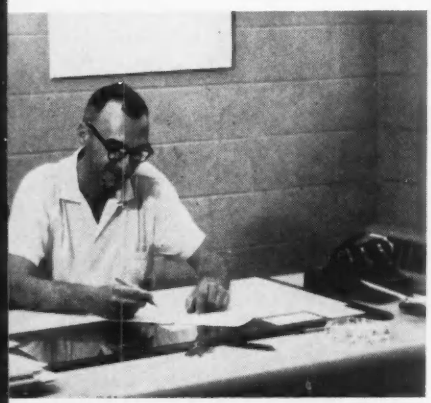
The Sunday that was "vacation" over, we arrived at Kingsport, Tennessee, where recent additions have kept this office of the Inter-Mountain Telephone Company as individual leader in size among the more than 2500 XY® Dial exchanges in the nation.

John Wilson, local manager, took us up to the switchroom where Lloyd Camp and his team of Stromberg-Carlson installers were adding equipment to provide 10,000 lines; the once-spacious building is fast filling

Last five feet are the hardest. Puffing Postman pauses after climb from gorge at Blackwater Falls, West Va.

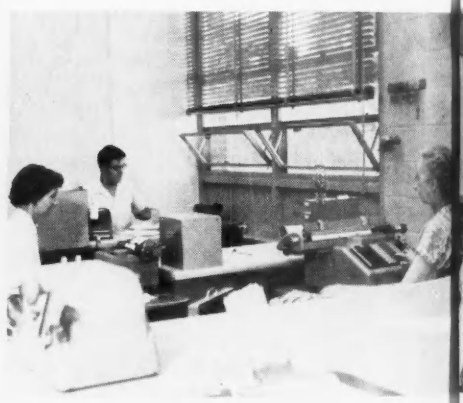


Stromberg-Carlson installer Richard White starts wiring lines in Canton, Pa., dial office.



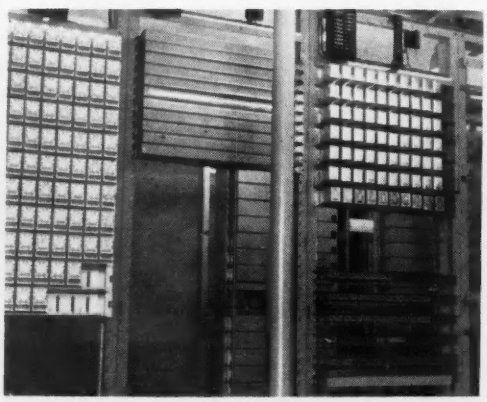
William Dunn, manager at Floyd, Virginia, left a big-city telephone job to live in a small town.

"How many wires in a cable?" John Wilson, Kingsport mgr., and Charles Browning, commercial representative, show samples to Mrs. Forbes.



Charlotte Weddle, Arthur Lee and Lena Whitlock in business office at Floyd. Machines speed up monthly bills.

Della Swiney, toll revenue supervisor for Inter-Mountain Tel. has 37 years service and 37 girls in department.



541 Negative Impedance Repeaters and 551 Hybrid Type Repeaters ensure toll-quality transmission for Farmers Mutual System, Edinburg.

H. J. Kleinhammer, general traffic superintendent; Robert Nicar, traffic force supervisor; R. C. Langdon, traffic engineer for Inter-Mountain Tel.

at the top of the mountain."

up. Present toll service is handled through a 36-position No. 3 switchboard, but a changeover to subscriber toll dialing is planned to improve efficiency. A new plant operations center is another mark of progress — one more indication that the telephone company anticipates and plans ahead.

At *Bristol* headquarters the 4-year span since our other visit seemed as nothing. The same top management group: Kelley McNish, John Sexton, "Dick" Reynolds; and the younger group, who had advanced to higher responsibilities as expected. It's reassuring, in a world where abrupt change is commonplace. This continuity extends to other Inter-Mountain offices where there is an atmosphere of sincere confidence, justified by competence.

Moving northward into Virginia, we were able to see the realized XY Dial conversions at *Abingdon* — home of the always delightful Barter Theater — and *Wytheville*, where distance dialing is soon to be added. Then you climb into the Blue Ridge Mountains and look for the town of *Floyd*.

This town is a small jewel in the Appalachian setting. No railroad ever tried to push up the grade; however, trucking built some of the finest homes; and prosperous farms ship milk, eggs and meat to Roanoke, Washington and Winston-Salem. While the county has lost population, Floyd itself has shown modest growth, with a new garment factory providing steady work for about 300.

William Dunn — after many years in the telephone business in Chicago and Detroit — tired of city life; is now immensely happy in the personal responsibility as well as the more intimate contacts of the small town company manager. With no thought of staggering strangers with statistics, he just does his job a little better than expected . . . . and sleeps well!

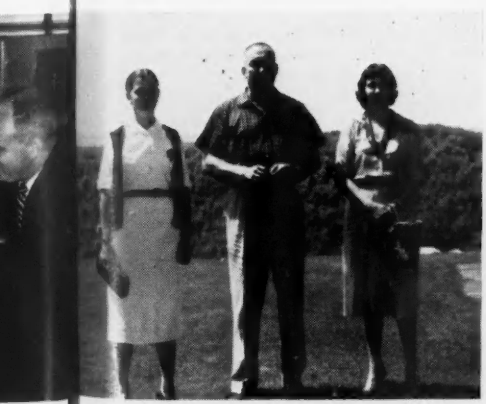
WHICH WAY IS UP?

The negative of this picture proves which side is actually the top. But try the page upside down before you decide. Photo taken in one of the many caves that draw thousands of tourists to the Shenandoah Valley in Virginia, served by Warren French and his Farmers Mutual Telephone Co. of Edinburg. Even year-round temperature makes these caves an all-season attraction.

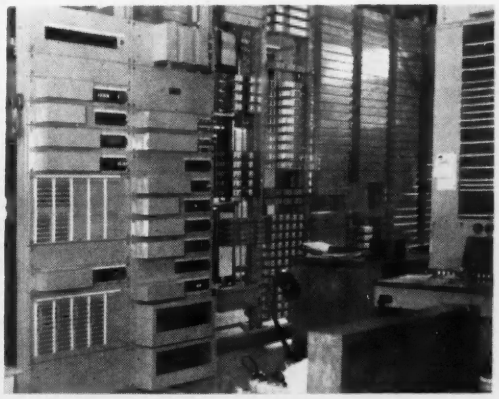
36-position Stromberg-Carlson toll board at Kingsport office of the Inter-Mountain Telephone Co.

Woodstock, Virginia, C.D.O. — one of 6 XY Dial offices covering the Shenandoah Valley from Newmarket to Strasburg.

Kingsport now 10,000 lines. Lloyd Camp (seated), S-C foreman with Frank Shelley, chief switchman.



Ed Filler, of Davis, West Va.; Mrs. Filler (right) and Mrs. Parks, wife of partner Gerry Parks.



Test and supervisory equipment are integral part of efficient operation at Inter-Mountain's Wytheville, Va., office.

Plant office of Canton (Pa.) Telephone Co. Larry Reinhard, plant manager and Mary Davis, accountant.

Portion of toll board at Edinburg, Va., serving the six XY Dial exchanges of the Farmers Mutual. New industry, chickens, apples, tourists provide ample traffic.

Route 11 through the Shenandoah Valley was the pioneer's trail to the West, became the north-south invasion route of opposing armies in the Civil War, and is the principal artery of commerce (and tourists) in western Virginia today. For 30 miles it becomes a trunk pole line connecting the six exchanges of the Farmers Mutual Telephone Company, from *Newmarket* on the south, through *Edinburg* to *Strasburg* at the north.

You might be surprised at the impressive main office in Edinburg if you didn't, at the same time, know that this is headquarters for a large and rapidly growing corporate system. The 6,000-station mark has been passed, and new industry will bring further additions. Just prior to our visit, an open house drew over 1,200 subscribers and a very handsome response to the free-installation offer for colored extensions.

Warren French, manager of the Farmers Mutual, drove us over towering Massanuten Mountain to the isolated valley known as Little Fort. Families here now have the good telephone service they had heard about, through connection to the French system, but it took 100% signatures — and many trips over the mountain — to validate the petition.

And speaking of mountains . . . . if you like them, you'll *love* West Virginia, but learn to use second gear unless you enjoy replacing brake linings! From Strasburg to *Davis* is 160 miles in the "horizontal" plane plus at least another 50 in roller-coaster vertical miles. These mountains have both made and retarded West Virginia; coal and forest products are the principal export, but you have to search for a prosperous farm, and community of interest is hard to generate when local transportation is so difficult. Much of the industry is controlled by out-of-state interests, with the attendant uncertainties for the local residents.

Waist-deep in the battle to bring West Virginia back to its own people are two men who headquarter in Davis: Gerald Parks and Edward Filler. They haven't a long history in the telephone business, but what they have done is surprising even to themselves . . . . whenever one goes off on a trip he promises the other not to acquire another property "unless it needs buying." And many times they have been unable to resist this "felt need."

Starting with a merger known as the Duncan Telephone Company, comprising *Davis*, *Thomas* and *Parsons*, they reached eastward to take

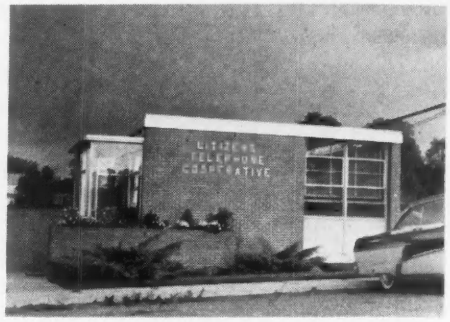
G. H. (Gerry) Parks, president of Duncan Telephone Co. at Davis, and vice-president of United Utilities of West Virginia.

in *Inwood* (later sold to the C. and P.), then clear across to *Wayne* on the west extremity.

The next step was the formation of a new company with REA assistance — the United Utilities of West Virginia (a name drawn from a hat). The nucleus of this new venture, in which Gerry and Ed reversed their respective positions of president and vice-president, was the acquisition of the Clay County system, followed by other towns such as Worthington, Flemington, Bruceton Mills and Valley Point. Modern plants with dial service are to be installed throughout.

Whenever these West Virginia men have stepped in, the town has become a better place for West Virginians. That's their purpose.

The home leg of the trip brought us to *Canton*, Pa., where Edward Flannery had Bill Powers and his crew of installers putting in a 2,000-terminal XY Dial office. This community is still in the process of evolution. What may be the last harness factory in the country has shriveled in importance, while a newcomer — the Collins Valve Company — is supplier to aircraft and electronic firms that serve tomorrow's needs. Riding along comfortably amid change is the Swayze Folding Box Company, and the predominantly agricultural rural circumference.



A winner in its class . . . . attractive telephone office at Floyd, Virginia.

Mr. Flannery and his plant manager Larry Reinhard are keenly aware that their own future lies with the future of the community; both are active in a group that is seeking new industry to keep the town virile — and incidentally provide markets for commercial telephone systems.

"Hasn't this been a wonderful trip!" said The Lady as we turned into the home driveway. "Now you mow the lawn while I get supper."

Edward Flannery, manager of the Canton Telephone Co. calls on a commercial customer — the Collins Valve Co. . . . . one of several new industries sparking town's economy.

Transmitter

GEORGE B. FORBES, Editor
J. T. LONG, Associate

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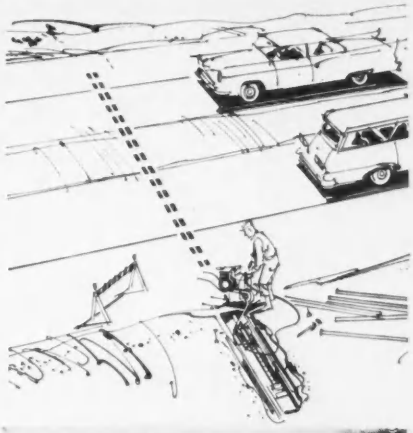
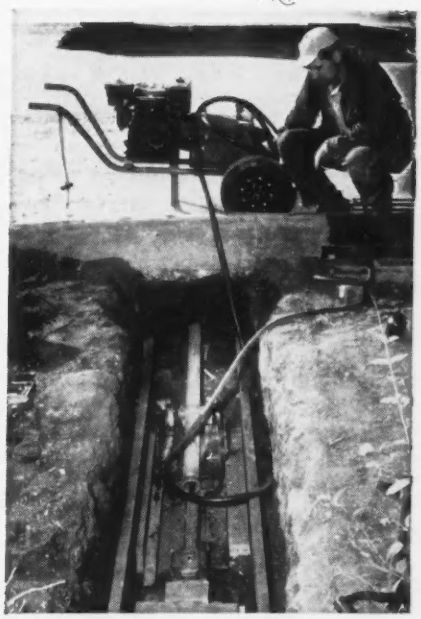
EASY, LOW-COST WAY TO RUN PIPE UNDER STREETS AND WALKS





Greenlee Hydraulic Pipe Pusher

Traffic proceeds as usual when your piping for underground cable crosses under the street this simple timesaving way. Model No. 790 shown pushes ¾" - 4" pipe about two feet per minute with power pump. A small ditch in the parkway accommodates the pipe pusher — streets and walks remain undisturbed, total job time is cut to a fraction. Ask your supplier for details or write for free literature.

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THE BACK OF THE BOOK

By JOHN G. REYNOLDS

Logic Circuit

IT HAPPENED in Little Rock, according to the *Arkansas Gazette*: Dad called home from the office. Young son answered the telephone. Dad asked to speak to Mom.

Son said Mom was in kitchen, why didn't he ring that phone?

Dad explained that kitchen phone was an extension, both phones rang at the same time. He couldn't ring the kitchen telephone as long as Son was on the line.

"O.K.," said Son promptly. "Just dial the number again and I won't answer. Goodbye." And he hung up.

Running Out Of Numbers

ACCORDING to the *Woodstock (Ill.) Daily Sentinel* the telephone company is finally running out of numbers.

"What else could you expect?" American Telephone & Telegraph logicians ask. After all: More than 17,000 new phones are installed every working day and most of them require separate numbers. Direct distance dialing is here, and with it large telephone areas which include many central offices. MAin 5 and NAtional 5, for example, are dialed by the same finger-holes.

"And scientifically," a telephone scientist said, "the phone speaks only the electrical impulses of dial clicks. Local dialing will get you the right exchange. Distance dialing can get the wrong one."

This causes the editor to comment: "But we non-scientific customers speak English. Consequently certain dial-hole combinations are never used to begin calls as the best exchanges they yield are KLamath, KRingle, YLang and WRath.

"There's nothing the matter with these exchange names," a telephone company diplomat said quickly. "KRingle is a happy image and YLang is a respectable Philippine tree. But the names are rather difficult. . . And, finally, the first dial opening is not used in exchange names to avoid electrical impulse mistakes. Zero, the last opening, is reserved as a means of calling the HUman BEings who comfort the equipment at the central office. And, further, there is neither 'Q' nor 'Z' on the dial."

The result, as any sound electronic brain can quickly see, is a seriously limited range of possible telephone numbers. The situation is so desperate, a telephone crisis expert explains, that: "When we set up the direct distance dialing areas for the nation, we left a safety margin of 66 unassigned area code numbers. That was 13 years ago and we've already used up 31 of those reserved numbers."

The supply should last, telephone estimaters say, until the mid-1970's. But in the meantime, intercontinental direct distance dialing is on the way, calling for new area codes. Scientific progress will also call for cue numbers to signify a person-to-person call, a call to a mobile unit, a direct call to an extension phone now reached only through a switchboard.

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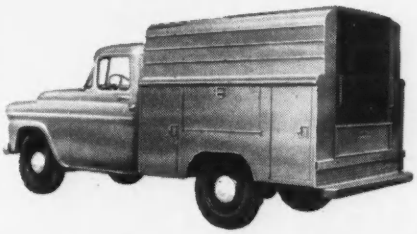
COMPARTMENTIZED TO FIT SPECIFIC JOB NEEDS

Which Series 22 Body do you need? Take a look . . . there's a model especially designed for your particular type of service work. The durable, all-steel unit shown above, equipped with an optional overhead rack, is widely used for general service work in all operations. Other models for electric, telephone and gas service have similar compartments fitted with various shelves and bins to meet specific work needs. Result: You get a custom-made body at a mass-produced price . . . plus increased crew efficiency on every job.

Series 22 Body features include flat, 16-gauge compartment tops . . . rust-proof, cadmium-plated door latches . . . nylon bushings in all door hinges . . . key-locking, weathertight doors . . . recessed, slam-action door catches . . . corrugated steel floor.

Available in 75″, 90″ and 104″ lengths, equipped with accessories to fit your particular need.

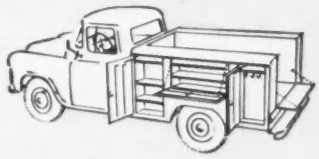


Need more storage space? Any of the four Series 22 models can be furnished with an all-steel superstructure. In addition to any optional items desired, the superstructure is fitted with two full-length shelves and three swivel hooks on each side, a window in the head panel and grab handles at the rear.

Self-Elevating Ladder Assembly

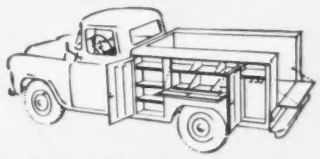
This time-saving assembly with six rubber-covered rollers and four powerful coil springs enables one man to quickly and effortlessly erect a ladder up to 36′ in length. The operator lightly pushes the end of the ladder down, and the springs do the lifting. Stowing is equally fast and easy. Ideal for use on 75″, 90″ and 104″ bodies. Includes 28′, 30′, 32′, 34′ or 36′ two-section extension ladder.

FOR ELECTRIC WORK



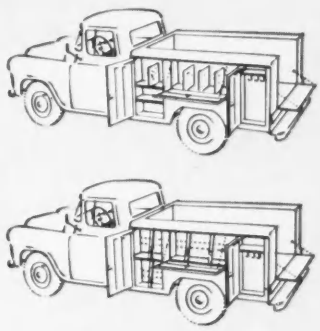
Series 22-E. Designed for service work in any phase of the electric utility industry. Special shelves and bins carry all the equipment and materials needed in the field.

FOR TELEPHONE WORK



Series 22-T. Compartmentized to carry a variety of telephone service tools, parts and materials. Standard arrangement of shelves and bins enables crewmen to quickly find items needed on the job.

FOR GAS WORK



Series 22-G. Two variations of this model are available for carrying either cast or tin meters. Rubber-padded compartments insure the safe storage of fragile parts and instruments.

Plenty of additional bins, shelves and racks carry tools, pipe, fittings, parts and all other equipment needed on routine or emergency service and maintenance calls.

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Royce is one of our "Revenue Men" in Spokane, Washington.

In 1942, Royce interrupted his college career to join the U. S. Air Force. As a bombardier in North Africa and Italy, he flew 50 combat missions — and was awarded the Distinguished Flying Cross with an oak-leaf cluster and the Air Medal with six oak-leaf clusters.

Royce came home in 1945 and began a career in sales. In 1954, he joined General Telephone Directory Company as a sales representative in our Spokane Division. By 1956 he was promoted to Sales Supervisor.

Royce has kept up his education through USAF correspondence courses — and has completed more than five hundred hours of study.

Now living with his wife and two children in Spokane, he is active in the BPOE, VFW, Early Birds and the U.S. Air Force Reserve.

Royce Ferguson is a good example of the "Revenue Men" who work for General Telephone Directory Company and for you. Men who are an asset to any community.

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